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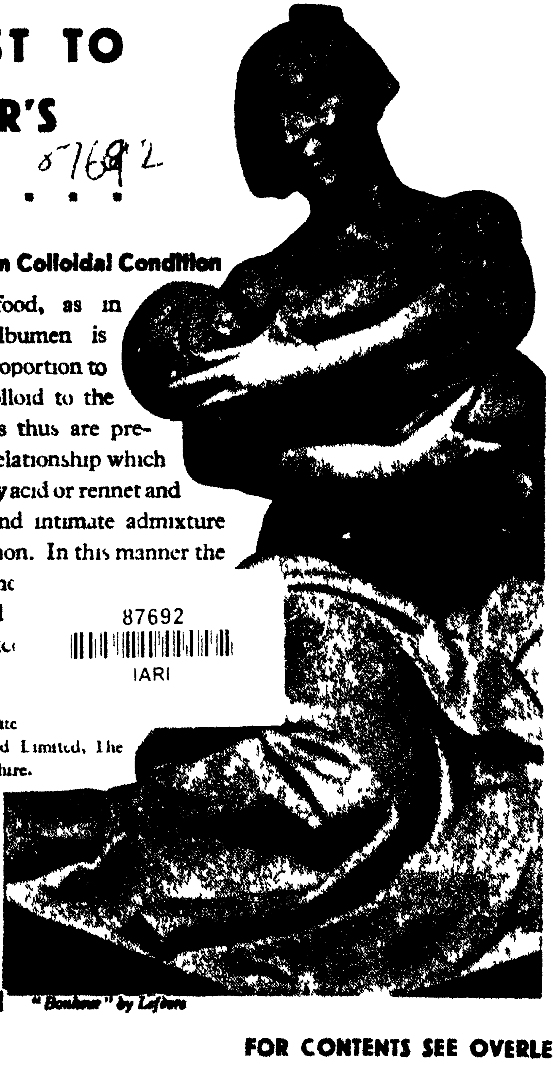

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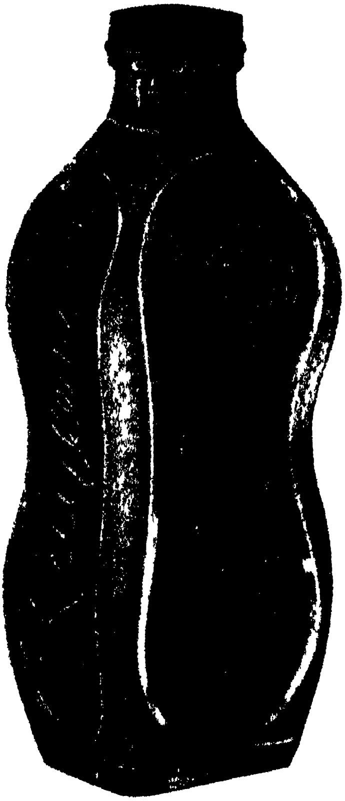

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THE SURGICAL ASPECTS OF DYSPEPSIA

By D. P. D. WILKIE, O.B.E., M.D., M.Ch., F.R.C.S.
Professor of Surgery, University of Edinburgh.

ONE of the most interesting problems in medical practice is the sifting out of evidence and the building up of a diagnosis in the case of the patient complaining of dyspepsia. Familiarity with the essential features of the different diseases associated with dyspepsia justifies some assurance in differentiating the acute discomforts of the functional upset, the gastric manifestations of constitutional disease, the reflex gastralgias of chronic visceral infections and the symptoms of organic trouble in the stomach or duodenum. In some cases from the history of previous good health, of an onset following some worry, chill, loss of sleep or dietetic indiscretion, there may be little difficulty in diagnosing a functional disturbance which will yield quite readily to treatment. In other instances the general appearance of the patient may furnish the clue, e.g. the facies of the phthisical patient will at once turn our minds to the dyspepsia of tuberculous disease, a complaint of headache and giddiness, and the presence of a slight puffiness of the face and a high tension pulse suggest the dyspepsia of renal disease. Similarly, in men over fifty years of age, the gastric disturbance associated with backward pressure on the kidneys must be borne in mind, inquiry made as to bladder function and the state of the prostate determined. In the thin asthenic type of female a general visceroptosis and lack of tone in the abdominal muscles may be the only discoverable abnormalities. If no general conditions such as the above be found we must then ask ourselves the following two questions:—

(1) Are the symptoms dependent on some organic lesion in the stomach or duodenum, or are they reflex from disease or disorder in some other abdominal organ? (2) If organic disease be present, can it be successfully treated by medical measures, or must recourse be had to surgery? I propose to draw attention to some points in the diagnosis of the various lesions commonly causing dyspepsia and to discuss briefly the indications for surgical interference.

PEPTIC ULCER

Whereas some peptic ulcers give rise to very few symptoms until perforation or hæmorrhage proclaims its presence, as a general rule ulcer cases give a very characteristic history of intermittent and stereotyped dyspepsia. It is seldom that an ulcer does not cause attacks of indigestion, lasting for some weeks, with intervals of freedom lasting for some months. Regularly periodic indigestion is very seldom found apart from ulcer. It is the rule to find that in the early period of the history the attacks of pain are clear cut and defined. They last two or three weeks, the pain comes on with clock-like regularity at a definite time after food and possibly wakens the patient at night. In long-standing cases the symptoms become less salient but more constant. Vomiting is rare in duodenal and quite common in gastric ulcer. A clear-cut history such as is sketched above is strong presumptive evidence of ulcer; on the other hand a history in which the pains are irregular and capricious, and flatulence is a prominent feature, should suggest a reflex origin for the gastric symptoms.

In first or second attacks of dyspepsia of ulcer type, it is justifiable to treat by dieting and medicine without further investigation. But in oft-recurring attacks, with evidence of stenosis or with a history of hæmorrhage, fuller investigation is demanded. The lengthening of the attacks, the increasing flatulence and sense of fullness after food, the tendency to vomiting in the evenings or during the night, together with the discovery of a large, splashing stomach, may proclaim a stenosis, the simple nature of which the radiological findings will confirm. If a peptic ulcer be demonstrated by X-rays is surgical treatment required?

The surgery of peptic ulcer.—A few years ago there was a strong reaction against surgical measures in the treatment of ulcer and in favour of prolonged medical treatment. This was consequent to the numerous bad results which had followed the indiscreet use of surgery as a quick method of treatment in ulcer cases. Now surgery is again being more frequently employed, but with deliberation and discrimination. The treatment of peptic ulcer is primarily and essentially medical, but there are certain conditions which render surgery necessary for its safe and successful therapy. In the case of duodenal ulcer these conditions are:—(1) Stenosis with dilatation of the stomach and gastric stasis; (2) persistent recurrence of symptoms after medical treatment; (3) inability of the patient to carry out adequate medical treatment; (4) two or more hæmorrhages.

In gastric ulcer the same conditions hold good but, in addition, the possibility of malignancy supervening makes a direct surgical attack on the large, chronic and penetrating ulcer desirable. This attack will usually take the form of a partial gastrectomy. If great care and discrimination be exercised in selecting the case for operation and in selecting the proper type of operation in that case, the surgical treatment of peptic ulcer will give a high percentage of satisfactory results. It is not an alternative to medical treatment, it is complementary to it and, in the suitable case, should be interpolated in the medical régime. In many cases timely surgery may mean a new lease of life for the patient; but ill-advised or ill-designed surgery may transform discomfort into lasting disability.

The bleeding ulcer.—Hæmorrhage is frequently the feature of the ulcer case which first raises the question of surgery. While it is a firmly rooted belief that patients very rarely die of hæmorrhage from a peptic ulcer, this belief is not supported by evidence. Bulmer found a mortality of 11·5 per cent. in cases of hæmatemesis from peptic ulcer, the death-rate in the male being twice that in the female sex. Repeated hæmatemesis or melæna, leading to prostration, especially in a male subject, must always call for consideration of surgical intervention. Short of operation the most effective method, both of stopping the hæmorrhage and maintaining the strength of the patient, is a blood transfusion. In the severe case this should always be tried first and, if it fail, operation recommended. Apart from its use as an immediate life-saving measure, operation should always be considered when two attacks of pronounced bleeding have occurred.

GASTRIC CARCINOMA

Of all forms of carcinoma which the surgeon is called on to treat, this is the most disheartening. There are two reasons for this :—(1) The onset and early stages of the disease are so insidious that the patient does not seek advice until the process is well-established. (2) The vascularity of, and free lymph drainage from, the stomach, and the periodic vascular congestion following meals, render early lymph and blood spread easy, and glandular, peritoneal and hepatic metastases all too common. If the carcinoma commence at the pylorus the symptoms and signs of an obstructive lesion may bring the patient early, and allow of a diagnosis in time for successful extirpation of the growth by surgery. The majority of gastric growths do not start at the pylorus but proximal to it; obstruction is not then a usual feature, pain may be absent in the early stages, and the only symptoms may be a loss of energy, loss of appetite and loss of weight. It is essential, therefore, that we should be on guard and suspect the presence of this very common form of cancer when faced with a patient complaining of vague symptoms of ill-health and ill-defined dyspepsia.

Two special examinations should invariably be made—a test meal to ascertain if free HCl. be present, and a radiological examination. The latter will often reveal a carcinoma long before the clinical picture raises more than a suspicion. Unless there be very clear evidence of extensive metastases it is always well to explore the abdomen in cases of gastric carcinoma. Sometimes one finds the growth less extensive than was expected, and resection is possible. Occasionally, if pyloric or duodenal obstruction is present, a short-circuiting operation will give some months of comfort, and even when nothing can be done at all there is often a curious Indian summer of betterment before the final weakening shadows fall.

REFLEX DYSPEPSIA

Appendix dyspepsia.—There has recently been a considerable difference of opinion as to whether there is such a pathological entity as chronic appendicitis. While most of us will admit that the appendix takes more blame than is its due and is frequently sacrificed on the altar of diagnostic perplexity, we will nevertheless maintain that a chronic grumbling inflammation of the appendix does not only occur but frequently gives rise to chronic and troublesome dyspepsia.

The characteristic features of such dyspepsia are the irregularity of its incidence, the absence of the clear-cut periodicity of ulcer, the susceptibility to discomfort after special articles of diet and, possibly, the presence of an occasional ache or discomfort in the right lower quadrant of the abdomen. On examination we find frequently a dirty tongue, no epigastric tenderness but definite tenderness in the right iliac fossa, and often a complaint of vague pain in the epigastrium when pressure is made over the appendix.

X-ray examination is helpful as it usually shows an irritable stomach with slight delay in emptying, a spastic duodenal cap, frequently some stasis in the lower ileal coils, and definite tenderness over the cæcum on screen examination. It may be possible to make out an irregular, segmented shadow of the appendix which empties slowly; the indirect evidence is, however, the more valuable. In some cases it is wiser to give a gall-bladder dye test as well, as the difficulty is not to say whether the appendix is diseased but whether it is the sole cause of the dyspeptic trouble. When there is evidence of appendicular disease it is folly to persevere with medical treatment for indigestion until the appendix has been removed.

Gall-bladder dyspepsia.—It has been estimated from the statistical records of the gastro-enterological departments of several American hospitals that gall-bladder disease comes first in frequency in the list of causes of dyspepsia. Certainly among women I should put it easily first. While most commonly found in middle-aged, stout, multiparous women it occurs at all ages and in all types, including those of spare, asthenic and visceroptotic build.

Discomfort, directly after food, flatulence and a sensation of distension in the upper part of the abdomen are the characteristic features. The taking of cooked fat in any form will usually cause discomfort and will sometimes precipitate an attack of acute pain. Aching in the right shoulder blade, often described as rheumatism, is common. Acute pain at the tip of the right shoulder is significant but only occasional. Aching pain under the right costal margin, especially after a chill or on active exertion, and a variable tenderness to touch in this region are characteristic. A history of acute attacks with malaise, fever, a faint tinge of jaundice and pronounced tenderness below the ninth costal cartilage point to recurring attacks of obstructive cholecystitis from a stone blocking the cystic duct or neck of the gall-bladder. Definite jaundice, associated with pain, a rigor, fever and loss of weight means that a stone is present in the common bile duct.

In doubtful, and indeed in all cases without jaundice, confirmation of the diagnosis by an X-ray examination after dye is helpful in deciding both as to the presence of disease and to the need for surgery. It is wise to give a barium meal after the dye. In quite a fair percentage of cases (roughly 8 per cent.) in females a duodenal ulcer will be demonstrated when the clinical picture suggested gall-bladder trouble. This "cholecysto-duodenal syndrome" is met with chiefly in well-nourished housewives who stifle their hunger pains ere they are recognizable, and obscure the ulcer picture. Not infrequently a history strongly suggestive of gall-bladder trouble is obtained, local tenderness is elicited, but from the dye test a normally functioning gall-bladder is reported. Such a finding will naturally weigh against operative interference and suggest a continuance of treatment on medical and expectant lines. It must be remembered, however, that in the end the clinical evidence is of greatest moment, and that a continuance of symptoms in such a case is an indication for operation.

The indications for surgical treatment in biliary dyspepsia are :—(1) Recurring attacks of colic, indicating the presence of stones; (2) an attack of acute obstructive cholecystitis; (3) persistent dyspepsia in spite of avoidance of fats and the taking of drugs to promote a flow of bile; (4) symptoms of stone in the common bile duct; (5) evidence of secondary toxic effects, e.g. chronic rheumatism, cardiac disorder, etc. Now that the surgery of the biliary passages has attained a standard of safety and success higher than that for any other abdominal organ, and as we know that the late complications of biliary infection are numerous and often fatal, it is difficult to justify prolonged expectant measures when a diagnosis of cholecystitis with gall-stones has been made. On the other hand, before allowing a patient with biliary disease to undergo operation it is necessary to see that she is in the best possible condition. Such patients are usually stout and often breathless on exertion. A period of three months on a reducing diet and regulated exercise should be prescribed and supervised. Such preliminary treatment makes operation both easier and safer. It must also be stated that operations on the biliary passages present many pitfalls for the inexperienced or unwary operator, and such operations must not be embarked on light-heartedly by those who have had no special training.

MULTIPLE LESIONS

It must always be borne in mind that lesions may be found in stomach, duodenum, gall-bladder and appendix in the same patient. A clinical picture, which otherwise would be confusing, may become clear if we remember that the "abdominal triad" of lesions, namely, duodenal ulcer, cholecystitis and chronic appendicitis, is by no means uncommon. I have operated on some thirty cases in which all three organs were diseased and were dealt with, and repeatedly we have found that a streptococcus can be grown from each of the lesions. Failure to deal with each and all of the lesions may lead to a continuance of symptoms and be the cause of a standing reproach to surgery.

For the successful treatment of the various conditions which give rise to dyspepsia there must be that accurate clinical study on which refinement in diagnosis depends. In this field, as in so many others, surgery must be ancillary to medicine, and in its practice the preparation and the after-care of the patient may equal or surpass in value the surgeon's purely operative skill.

FLATULENT DYSPEPSIA: ITS CAUSES AND TREATMENT

By JOHN HENDERSON, M.D., Ch.B., F.R.F.P.S.G.

Professor of Medicine, St. Mungo's College, Glasgow; Visiting Physician, Glasgow Royal Infirmary.

THE above subject, with which I have been invited to deal in this article, can only be approached by some attempt to define a term which at the present day is used rather loosely and vaguely. It is largely a "lay" term with a wide reference to all forms of gastric disorder in which flatulence is a prominent feature, and in which there is not any discoverable organic lesion. Even medically it is commonly used with similar significance, as it is a diagnosis which meets with ready acceptance by the patient and the patient's relatives. Flatulence, or the presence of an excess of gas in the gastro-intestinal tract, may occur simultaneously in the stomach and intestine, though in the majority of cases it is confined to the stomach. Obviously it may result from: (1) An excessive production of gas of some kind from chemical changes, usually by fermentation or by putrefaction; (2) an excess of air swallowed—aerophagy in some form; (3) deficient elimination or absorption.

Aerophagy.—In ordinary circumstances in health a certain amount of air is swallowed: (1) With food, more with fluids than solids, and more when feeding is hurried and mastication deficient; (2) with saliva, and hence more when for some reason this is excessive. In certain diseases also associated with pain, particularly when this pain is paroxysmal as in cardiac disorders, angina pectoris, and various types of colic, especially hepatic, the cessation of pain is often associated with copious eructations. The origin of the flatulence here is doubtful, but is most likely air swallowing.

The term aerophagy here is used to describe a condition which may arise from an acquired habit, unconsciously, particularly in those with some form of digestive difficulty, or more classically at the present day it refers to the several types which occur independently of dyspepsia and as part of a pure neurosis. In the former type the patient has a feeling of discomfort or distension in the stomach, which is felt to be due to "wind," and which he attempts to ease by eructation. As there may be little or no excess of gas the attempt is unsuccessful and results in the swallowing of air. Repeated attempts, however, result in such an accumulation of air that eructation is ultimately successful and apparent relief ensues for a time. This may become a habit. In the latter and more severe type there may be severe attacks of noisy eructations following one another in rapid succession, perhaps going on for hours or days, and in some such cases mental excitement produces a paroxysm. Large quantities of air are swallowed with saliva until the stomach is distended, when spasmodic movements of the diaphragm are set up which pump the air backwards and forwards between the stomach and œsophagus, till finally it is expelled with a noisy report. The whole process may be clearly observed in some cases, but in others the air-swallowing may not be perceptible. The gas thus eructated is, of course, odourless and tasteless. This condition is more common in hysterical women and neurasthenics, but has also been observed in children, and several instances have been noted in one household. These cases would appear to be rather on the increase, as I have seen several within recent weeks.

One interesting case was that of an old lady, over 80, who was quite certain that she had an obstruction in her gullet, and made continuous efforts to get rid of this by eructation. Though an examination by X-rays during and after an opaque meal showed no such obstruction, and ordinary clinical examination of the chest and examination by throat specialist revealed no reason for her symptoms, she remained quite unconvinced. She did swallow a fair amount of food, both liquid and solid, none of which was returned, but even this did not dispel her illusion. Her stomach was enormously distended with air swallowed during her exertions, and the belching of air went on almost constantly with considerable noise. The distension of the stomach was on occasion so great as to become painful, the condition of pneumatosis.

Deficient elimination of gas will occur whenever there is diminished absorption owing to catarrhal conditions, or to portal obstruction in hepatic cirrhosis, or cardiac failure with consequent backward pressure, or when there is an atonic dilatation. Swallowed air and the gases of fermentation are insufficiently absorbed with the result that flatulence may become a troublesome feature.

With the increase of accuracy in diagnosis in gastric disorders due to modern methods of examination the term dyspepsia has acquired a much more limited significance, and many cases formerly grouped as acid dyspepsia, or atonic dyspepsia, are now recognized as early stages of gastric ulcer or catarrh, as mild cases of acute gastritis, or as symptomatic of general affections, such as anæmia or renal disease. Apart then from definite organic lesions in the stomach which give rise to dyspeptic symptoms, two groups of cases are separable : (1) Functional dyspepsia, i.e. without obvious pathological changes; (2) nervous dyspepsia, associated with definite nervous temperament or with definite neuroses, such as neurasthenia or hysteria. The distinction between these is, of course, somewhat arbitrary, as both are based on disturbances of function, either motor, sensory, or secretory, or a combination of these.

So far as flatulence is concerned, it is almost entirely found (at least in a well marked degree) in cases in which the disorder is an error of defect. Hypochlorhydria, or sub-acidity, is met with in those who follow sedentary mental occupations, especially towards middle age, in women towards the climacteric period, or associated with neurasthenia or hysteria. Accepting this as the special type of flatulent dyspepsia for the purpose of this paper, the most constant symptom is a sensation of fullness and oppression in the epigastrium and under the left costal margin, which may amount to actual pain. This comes on soon after the taking of food, and persists often for most of the day, with flatulence, headache, drowsiness, and constipation. Vomiting is not a feature, but when it does occur it affords a welcome relief. The tongue is pale, flabby, broad, and indented by the teeth. The distension of the stomach by gas may cause upward pressure on the diaphragm, and this in turn may give rise to cardiac embarrassment with palpitation and fluttering in mild cases, attacks of pseudo-angina in others, and even may induce an attack of true angina or asthma in those liable to such paroxysms. The condition may be partially relieved by gaseous eructations. Full inquiry should be made, as in all cases of disturbed digestion, of the time taken over meals, the nature and the quantity of food taken, and the regularity of feeding. Deficient teeth, deficient mastication, and constipation are almost always the prominent features in the history and etiology.

The above condition is often associated with defective motility of the stomach, and may then result in atonic dilatation (i.e. non-obstructive) due to atony of the muscular coat. This tends to be progressive unless the cause is removed. A history of poor general health, chronic dyspeptic symptoms, and obstinate constipation is often obtained. Poor physique, and bad or deficient teeth are almost constant accompaniments. In this form flatulence is a prominent feature, usually with fermentation as the condition becomes more advanced, and a test meal shows the lack of free hydrochloric acid, though the total acidity may be normal or increased owing to the increase of organic acids. An X-ray examination after an opaque meal shows the shape and outline of the stomach, the position of its lower border, and the lack of motility with prolonged retention. Complete absence of free hydrochloric acid in the gastric juice (achlorhydria) is rare in functional or nervous types of dyspepsia, though it is an almost constant feature in cases of chronic gastritis, carcinoma of the stomach, and diabetes mellitus, and is a characteristic precursor or accompaniment of pernicious anæmia. The most extreme type, achylia gastrica, in which there is entire absence of gastric juice, both acid and ferments, is rare as part of a pure neurosis. In any case, it is as a rule associated with hypermotility, so that there is little time for gas formation. This condition can only be diagnosed by complete gastric analysis.

The diagnosis of aerophagy is not, as a rule, difficult when the physician has an opportunity of observing the patient during a spasm or paroxysm of eructation. The patient collects some saliva in the mouth, slightly flexes the head on the chest, closes the mouth and swallows. Thus the air is forced into the œsophagus, producing a sound which is believed to be an act of eructation whereas in reality it is the opposite. On opening the mouth air is belched forth noisily, and then swallowing and eructation follow closely on one another. When in doubt the diagnosis can be confirmed by X-rays, under which by suitable arrangements the whole process may be observed in operation.

TREATMENT

In all cases of flatulent dyspepsia it is safe to say at the outset that success in treatment can seldom be expected if the gastric symptoms alone are considered. Attention should be directed in the first instance to the cause or causes in operation, and these should, if possible, be removed or corrected, and any constitutional condition suitably dealt with. Worry and mental exhaustion are best countered by change of air and scene when this is possible, and in cases in which the neurasthenic or neurotic factor is strong a course of Weir-Mitchell treatment, with isolation, absolute rest, and massage, may be beneficial.

The importance of dental attention cannot be too strongly emphasized, as proper mastication of food is the foundation of all treatment. Bad teeth should be removed, defective teeth suitably treated, and a sufficiency of teeth insisted upon, and generally the proper toilet of the mouth should be stressed. Constipation, which is almost universal in such cases, should be corrected, not by occasional purges, but by regular stimulation of the bowel. In this connection abdominal massage suited to each individual patient is a valuable aid, perhaps supplemented by abdominal exercises. Regular exercise should be advised, avoiding over-fatigue. A short rest both before and after meals is beneficial, though not always possible. Faults of hasty eating, overeating, or overdrinking should be corrected, and the times of meals suitably spaced. It is advantageous to prescribe in detail the diet suitable for each case, as thus both the quality and the quantity can be regulated. As a general rule, all highly-seasoned or indigestible foods should be forbidden, and unless alcohol in some form is considered necessary it is better omitted. Even tea should be weak and used sparingly. The use of tobacco should be restricted, and in some cases (especially where acid is in excess) forbidden.

These are general rules which can be adapted for application to all cases, but with regard to medicinal treatment it is of the utmost importance to avoid indiscriminate drugging, as such patients are only too apt to fly from one remedy to another, and to add a " drug dyspepsia " to their original ailment. We should discourage at every opportunity the habit which is very prevalent at the present day of what may be termed " drawing-room prescribing," on the ground that what is suited to the needs of one may be entirely unsuited, or even harmful, to others. Medicinal treatment to be on proper lines must be directed both to the general and the local needs. Tonics or sedatives may be necessary as the case demands, and the constipation which is an almost constant feature should be regulated by a cascara preparation, either the evacuant given thrice daily in suitable doses or cascara given in a mixture form thus :—

℞	Ext. casc. sag. liq.	℥ iss
	Liq. potassæ	ʒ iii
	Tinct. nuc. vom.	ʒ iii
	Aq. chloroformi ad	℥ vi

Sig. ʒ ii t.i.d., a.c.

I have found magnolax a very useful remedy in all forms of gastric and duodenal disorder, given twice or thrice daily in dosage sufficient to produce a daily evacuation. Further medicinal treatment should be on lines calculated towards correcting deficiencies or neutralizing excesses in the gastric juice in the various types of disorder to which reference has been made. The best results therefore can be expected in those cases only in which a careful gastric analysis has been carried out to provide the necessary data.

When *hypochlorhydria* is present special dietetic instructions should include limitation or exclusion of meats and farinaceous foods, and especially of bulky vegetables, as potatoes and cabbage, and the exclusion of pastry and other indigestible articles. Fats should be avoided, though butter may be allowed in moderate quantity. Light, strained soups may be permitted. Meals otherwise should be dry, fluids only to be taken after the meal. Tea, if taken, should be weak. It may be thought advisable in this form to allow a little whisky or brandy. An alkaline bitter mixture given before meals is often valuable in neutralizing organic acidity, and may improve both appetite and digestion by stimulating gastric secretion. Such a mixture may take this form :—

℞	Sod. bicarb.	gr. xv
	Tinct. nuc. vom.	♏ v
	Inf. gent. co.	ʒ ii
	Aq. chloroformi ad	℥ i

Hydrochloric acid, with or without pepsin, is essential in such cases :—

℞	Ac. hydrochlor. dil.	♏ xx
	Glyc. pepsini	ʒ i
	Syr. aurantii	♏ xx
	Aq. ad	ʒ iv

Sig. To be taken 15 or 20 minutes after meals.

For the relief of flatulence, should it be necessary, sipping hot water, plain or with added carminative as peppermint or cinnamon, may be beneficial, or a few drops of the essential oils may be given on sugar. When the deficiency of acid is greater, as in achlorhydria or achylia, naturally much greater doses of hydrochloric acid are called for, up to ʒii or even more without or with pepsin, with a flavouring of orange juice or syrup, and given well diluted to be sipped during meals. Experimentally it has been found that the individual need for acid in such cases is a variable quantity, so that the requirement for each case may only be arrived at by trial.

Atonic dilatation.—Here the regulations as to diet are similar to the foregoing, but the meals should be in smaller quantity as well as dry; the fluids are better taken between meals. Alkaline bitter mixture before meals as before, with acid following, should be employed, but it may be considered advisable to supplement these by a pill calculated to increase the muscular tone of the stomach :—

℞	Ext. physostigmin.	aa. gr. ¼
	Ext. nuc. vom.	
	Excip. q.s.	

Sig. One pill night and morning.

In this form a daily stomach lavage may be necessary at the outset, and abdominal massage and exercises should be advised. Short-circuiting operations should be reserved only for cases in which the above line of treatment fails to relieve the condition, or those in which there is marked difficulty in emptying the stomach, as shown by X-rays and evidence of fermentation. Such extreme measures are rarely necessary.

Hyperchlorhydria.—In those cases of hyperchlorhydria which may be associated with flatulence, the diet should consist of light meats and proteins, fish and eggs, but soups are better excluded, as well as all greasy materials except butter in moderation. An alkaline mixture or powder after meals is indicated, and it is advisable to time the dose so as to anticipate the main increase in acidity. This can, of course, only be accurately done with the aid of a fractional test meal, but, as a rule, the most suitable time is a half to one hour after meals:

$$\text{℞}\quad\left.\begin{array}{l}\text{Sod. bicarb.} \quad - \quad - \quad - \quad - \quad - \\ \text{Bism. oxycarb.} \quad - \quad - \quad - \quad - \quad - \\ \text{Magnes. carb. lev.} \quad - \quad - \quad - \quad - \end{array}\right\}\text{aa. gr. xx}$$

Sig. To be taken in water or milk.

Or this combination may be given in mixture form with sufficient mucilage, and perhaps then supplemented with benefit by the use of a carminative water as vehicle.

In the purely nervous types, tonic or sedative drugs may be required, or special combinations to correct deficiencies or excesses as shown by gastric analysis, but the main line of treatment here is to gain the confidence of the patient, and, organic disease being excluded, to give him assurance as to recovery.

Aerophagy may call for special treatment. Many cases subside when the true condition is carefully explained to the patient and suitable restrictions are made as to eructations, but in more severe cases more may be required. It may be necessary to isolate the patient and to use disciplinary measures, including the periodic passage of the stomach tube, keeping it in position for several minutes. Actual lavage of the stomach may at times be considered beneficial. It is well to remember that this condition is prone to relapse, and the knowledge that such relapse may call for a repetition of disciplinary measures is often a good corrective for the patient. Belladonna or atropine in careful dosage, with a carminative or sedative vehicle is at times of service in relieving the actual spasms.

SOME CHRONIC MILD DIGESTIVE DISORDERS IN CHILDREN

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INTRODUCTORY

THIS article deals with chronic forms of disordered digestion of the upper digestive tract in children of older age than infancy, the digestive disorders of infants being referred to only in so far as they affect later childhood. At a young age it may be very difficult to trace the cause of chronic alimentary disorder, and there may be no evident disease or palpable lesion. The child may make very little complaint and may not be able to describe symptoms or locate pain. Nevertheless, efficient diagnosis is necessary for effective treatment. A detailed questioning of the mother is very important because generalizations may be misleading. For instance, "vomiting" may to her describe posseting, regurgitative sickness, sudden emptying after overloading, the projectile vomiting of cerebral lesion or of pyloric stenosis or the sickness of migraine or of acidosis. The vomitus may consist of unchanged food or may be bilious, curdled, or exceptionally sour; stools may show many peculiarities and not merely looseness or constipation; pain may occur immediately after food or some time after, may follow exertion, and must be distinguished from tenderness. Time spent in obtaining a careful history is therefore seldom wasted and may point at once to the correct line of treatment.

As a preliminary to treatment we have to realize a little about physiology and anatomy. We should visualize the intestinal villi and their power of absorption and the smearing over them of a fine food emulsion. This emulsion should contain the correct balance of fats, proteins and carbohydrates because they have to be in the right proportion to one another for the proper absorption of each to take place. The pylorus and duodenum should allow such an emulsion to pass in an unhurried manner and in not too large a quantity on into the small intestine. The blood supply must be healthy and able to absorb the nourishing parts of the food, especially proteins, fats and carbohydrates, and vitamins and salts. Badly cooked food and badly served food is physiologically unsound because attractiveness in food is most important for creating an appetite, and appetite is essential for the proper functioning of digestion. A finicky ailing child needs great care and patience to tempt him to take food, and even a hungry child is much the better for well-chosen food, warm, properly cooked and nicely served.

The digestive tract consists of soft-walled distensible chambers furnished with glands and lined by secreting and absorbing mucous membrane. The movements to and from the chambers are controlled by valves and neuro-muscular mechanisms such as those of the glottis, the cardiac end of the stomach, the pylorus, the duodenum and ileo-cæcal valves. Comfortable swallowing, pyloric relaxation and contraction, duodenal filling and emptying, unhurried and free movement of the small intestine to allow absorption, and the mass movements and sudden shiftings of large amounts in the large intestine are needed for healthy digestion. Barclay[1] suggests that movements of food in the upper part of the tract are due to action of the muscularis mucosæ and not to peristalsis. His term " rippling " is a better one than " churning," and describes what we can imagine to be the ideal method of throwing the food emulsion about on the mixing and absorptive apparatus of the linings of the stomach and small intestine. It is also important to remember that disturbance of stimuli in the lower part of the intestinal tract may upset contraction and dilatation of the valves in the upper part. Thus an ileo-colic disturbance may upset pyloric action.

Disposition has an effect because digestive powers differ greatly in different children. For instance, a tendency to duodenal attacks may run in a family. Some children (the exudative type)[2] seem to have "liverish" attacks if they have much fatty-acid producing food. They have a series of what are usually called "chills on the liver" when bile secretion may be disturbed with whitish stools or even with jaundice. There may also be an infective element in the causation of these attacks. We shall deal with them under duodenal and acidosis attacks. In these and other children excitability and excessive mental energy may cause excessive peristalsis or a nervous spasm of the bowel which will be considered later under "spastic colon."

Some children use up their blood-sugar rapidly and need a carbohydrate snack if they go without food for long. Glucose is a fashionable remedy at present, but boiled sweets and biscuits are often quite efficacious unless quick action is needed. Others again are thin and lean and need a large intake because they have a large calorie loss. Others are conservative and anabolic and remain well nourished on small amounts of food. A dispositional hypochlorhydria is well known to occur in families, and allergic reactions may affect absorption of foodstuffs by the villi.

Finally, digestive disturbances may be infective in origin and have nothing to do with disposition. Gastritis and enteritis due to some infective microorganism may leave behind an irritable condition of the mucous membrane, especially that of the villi, prolonged treatment with light diet and avoidance of certain foods being necessary before the mucous membrane recovers its functions. In such cases it is a bad mistake to add to the work of an already overloaded mucous membrane by too rich feeding early on in the illness. The reflex effects of infections of the appendix or mesenteric glands must also be remembered.

NEGATIVISM AND FOOD REFUSAL

Some children are very difficult to feed and apparently have a constitutional aversion to much food. This aversion and anorexia are sometimes due to digestive disturbances in infancy which have left their effect on the digestive organs and their juices. At the age of, say, two to four years such children show marked anorexia and may refuse to chew or swallow, often keeping a bolus of food between the cheek and gum for hours. They cause great anxiety to the parents, but they usually improve as time goes on. They may be of the sensitive nervous type, and are thin and pale, but they are potentially fairly healthy and respond gradually to efforts to feed them. We can use digestive tonics such as nux vomica and gentian, dilute nitric acid, or aids to digestion such as peptic or diastatic preparations. Takadiastase gr. iv t.d.s. is often useful. For the promotion of appetite it is important not to impede digestion with rich tonics but rather to use aids to elimination and digestive tonics such as rhubarb and soda and nux vomica. Sometimes more highly flavoured foods are better taken than the usual nursery diet, and if so there is no harm in giving on common sense lines a mixed diet with more tasty foods if the child prefers them.

Other children may develop and carry on to the age of even four or five years a more passionate form of negativism. They are generally strong-willed and emotional children who have developed the habit of resisting the efforts made to feed them. Very often these efforts are fussy ones and due to over-anxiety on the part of the parent or nurse. The child's meal becomes a centre of observation and notice, and all this reacts on a certain type of child. The persistent efforts of a painstaking, but not naturally confident, mother or nurse irritate the highly intelligent and sensitive child. A battle of wills ensues, often prolonged and it may be stormy. Each recurring struggle accentuates the refusal until the mere sight of food may send the child into a passion.

Treatment is obviously chiefly on the lines of management such as meals with other children or with other people in the house. A stay in a nursing home is usually successful and whoever has charge must be breezy and confident and avoid all glances or whispers or gestures which let the child feel that an interest centres around its meals or the amount it takes. Such children may take medicines quite well and even feel offended if they are not given regularly. This is the spirit to cultivate with regard to food if possible.

CONGENITAL, MECHANICAL AND NERVOUS CONDITIONS OF THE UPPER ABDOMINAL TRACT

The habit of *swallowing air* is not very uncommon. It may persist from infancy or be hysterical in nature. Treatment is by educative measures through which the child develops more control of co-ordination of swallowing, by choice of a diet and by more careful chewing. Regurgitation due to *achalasia* or spasm of the cardiac end of the stomach is rare but does occur. Treatment is by dilatation methods. True *rumination*[3] in which the child regurgitates part of the meal and chews it, is rare. There is usually a definite family history and the condition is difficult to cure. Some children show signs resembling rumination but are not real cud-chewers. Owing to chronic pyloric trouble and regurgitation they have learnt to bring the food back into their mouth and to savour it. The habit usually disappears in time but may return periodically and may need medical measures for pyloric delay, such as belladonna, lavage and sodium bicarbonate.

Pyloric spasm with occasional sour butyric acid sickness.—Chronic pyloric obstruction may be due either to spasm or to a modified degree of hypertrophy which has not been bad enough to necessitate operation. One occasionally sees cases like A. J., age 8, male, convulsions at two weeks old. Not well for three years. Repeated attacks of vomiting of " food " or " water " or " bile," usually one attack every two to three weeks. The attacks last 24–26 hours. No palpable masses in the abdomen but an X-ray showed poor gastric tone and poor peristalsis. No barium passed out of the stomach in three hours. In such cases there is usually a disturbance of innervation due to some septic focus or irritation and this causes the pyloric delay. Again, cases with sour " butyric acid " regurgitation and recurrent vomiting are not very rare especially in later infancy. The sour sickness is a characteristic feature and indicates pyloric delay and a residue from the previous meal.

The treatment of pyloric delay is to allay spasm by small feeds at frequent intervals, to sooth the neuromuscular excitability by rest and quietness and to give anti-spasmodics such as belladonna. For a child of four tr. belladonna ♏ ii–iii; sod. cit. gr. vi with syrup and chloroform water is suitable before meals, which should be at moderately short intervals and of limited bulk. Lavage may be necessary and so may operation, but in most cases treatment on the above lines will allay spasm so that the pyloric irritability gradually disappears. Sodium bicarbonate in fairly large doses before meals may be useful. It must also be remembered that *reflex spasm* of valvular mechanism, pyloric and colic, may occur from intra-abdominal septic foci, such as enlarged mesenteric glands.

Constipation.—This is too big a subject to be dealt with in this article though its effect in causing indigestion and discomfort in children is considerable. It is important to decide which type of constipation it is, whether colonic or dyschezic, and to try to remedy it by suitable dietetic and physical measures (massage and exercise) rather than by medicines. Over-feeding or more particularly unbalanced feeding is often the cause.

Piles are not so rare in children as one would expect. They do not often give rise to loss of appetite or indigestion, but fissures in the anus may do so because they upset defecation.

Hirschsprung's disease is not often seen, though its treatment by sympathectomy has brought it into prominence of late. The final results of this operation are still under review.

INDIGESTION ASSOCIATED WITH LOWERED GENERAL HEALTH

A general low state of health with lowered muscle tone and anæmia is frequently produced by: (1) Bad hygiene. (2) Chronic toxic states,[4] such as rheumatism and tuberculosis. (3) Nervous mental states such as depression, anxiety. In such conditions the lowered health leads to dyspepsia and indigestion. This in its turn reacts on the general health so that a vicious circle is formed. To raise the child out of such a vicious circle is not always easy and at the outset I should like to emphasize the importance of rest, not necessarily rest in bed, but by keeping the child off his or her feet. Suitable amusement and occupation must be provided.

(1) *Bad hygiene.*—If the lowered health is due solely to bad hygienic conditions, and there is not any infective disease, treatment is by well-balanced diet, skin ventilation, sun, rest, peace of mind and, perhaps,

a change of air. Useful tonics are nux vomica with gentian before meals or with a dilute hydrochloric acid mixture after food. A cod-liver oil emulsion preparation with malt is usually absorbed well. If there is lack of tone with inefficient gastric and intestinal rippling and with bowel stasis there may be constipation. The remedy is obviously to raise the tone of the bowel. Massage to the abdomen and drugs like belladonna, nux vomica, aloes, cascara are useful with perhaps occasional doses of phenolphthalein in addition. Former rickets may have caused anæmia and may, in my opinion, have a prolonged effect on fat digestion and liver efficiency because it has produced fatty infiltration of the liver. If so, avoidance of rich fatty foods and grey powder, say one grain twice a day, for three days out of ten or a mild rhubarb and soda mixture may be helpful. If there is a serious deficiency of either hæmoglobin or red blood corpuscles, an iron tonic or a palatable and not too rich hæmoglobin preparation or a liver extract can be given. Fresh liver extract sieved through fine muslin can be used flavoured with port wine or lemon-juice or as a sandwich, but is not so handy as are the various proprietary preparations. Ferri et ammon. cit. still holds its place amongst the iron preparations and with due precautions need not mark the teeth permanently.

(2) *Chronic rheumatism,* so called[3], often causes lowered health and indigestion. There may be naso-pharyngeal catarrh or recurring tonsillar, duodenal and, perhaps, appendicular attacks. There is usually lack of tone of the bowel with constipation, offensive breath, a furred tongue, a distended abdomen and generally dyspepsia and debility. Liver action is defective and may take some time to recover full efficiency. Duodenal attacks or " chills on the liver " may be difficult to distinguish from appendicitis. Pale stools and the limitation of pain and tenderness to the

upper abdomen rather than to the lower are points which help. The curative treatment in this type of case is to remove the septic focus surgically if possible. If a hæmolytic streptococcus be present in the stools a light diet and efforts to stimulate natural gastric, liver and intestinal action are needed together with the administration of bowel disinfectants such as kaolin, sodium salicylate, sodium sulpho-carbolate and salol. Autogenous vaccines may be useful. Restoration of tone of the bowel, however, is the most important method of treatment, because this means the avoidance of stasis and of an accumulation of mucus. Drugs like nux vomica, aloes, rhubarb and soda, hyd. c. cret. can be used to stimulate the natural forces. Massage and regulated exercise may be useful. The teeth may need attention.

A chronic toxic state due to *closed tuberculosis* may cause anorexia, dyspepsia, abdominal pain and ill-health. To shut away such a focus we must aim at fibrosis and calcification. Rest is needed together with good absorption of a rightly balanced food. Too often in diets for cases of early and closed tuberculosis the fats are pushed to excess and this interferes with the absorption of the all-essential proteins. Correct food, good climate combined with sun or ultra-violet rays and the raising of the general health by tonics usually promote absorption and cure the indigestion symptoms. Creosote ♏ ½, emuls. ol morrhuæ ʒi t.d.s. is useful. Garlic preparations may be tried and a malt extract may be given with the cod-liver oil emulsion and often helps a return of appetite.

(3) *Nervous mental states* may have a considerable effect on digestion and lead to anorexia, lowered efficiency of gastric and duodenal and hepatic digestion with furred tongue and constipation. Preoccupation with school work, too many home lessons, anxiety neuroses with perhaps dread of parents, nurses,

teachers or older children, nerve storms and other similar influences are likely to lead to dyspepsia. The child is, however, often of a sensitive disposition, and naturally finicky, with fads and fancies about particular foods. Such fads may be quite genuine and should not always be dismissed as unreasonable. For instance, exudative children often cannot digest much rich, fatty food. Some children are upset by orange juice, others may have real food allergy and sensitiveness to certain foods.

Sameness of food and unattractiveness have more effect on some children than on others. A little thought given to the daily menu, the use of relish foods like marmite sandwiches, cheese, and in a mild way condiments and pickles may be a welcome relief to milk puddings, jam and sweet cakes. Salad sandwiches may also be very acceptable. We must consider that the digestion of a child with hypochlorhydria may be helped by a little vinegar and a sluggish appetite may be stimulated by a relish sauce. We are perhaps a little too liable to limit all children to a nursery type of diet without taking into account individual tastes.

STOMATITIS AND GASTRITIS

An inspection of the mouth may reveal inflamed areas and small ulcers. Reddening and excoriation of the anus may be present. Treatment is by alkaline mouth washes, mild aperients, and a light diet, using foods which do not irritate the sore mouth. Gastro-intestinal disinfectants may be used, such as :

℞	Sod. bic.	gr. iv
	Glycer. acid. carbol.	♏ii
	Syr. aurant.	♏x
	Aq. chlorof. ad.	ʒii

Sig.—ʒii t.d.s. for a child over four years of age.

Or as an alternative :

℞	Salol.	gr. ii–iii
	Emuls. petrol.	ʒi

Sig.—ʒi t.d.s.

In other cases there are periodic crops of ulcers in the mouth. An examination for organisms usually reveals a streptococcus, but the crops seem to come from metabolic upsets and are often recurrent in exudative children. They may be painful and disagreeable, but usually clear up fairly quickly. Ulcerative stomatitis is usually obvious and acute. It generally responds rapidly to potassium chlorate given internally in doses of gr. v t.d.s. to a child of, say, five or six years.

Over-feeding may distend the stomach and cause a simple mechanical vomiting. Irritating food and exposure to cold and infection may cause a gastritis which persists for some days. There is a furred tongue, slight fever, loss of appetite, epigastric discomfort and perhaps vomiting of sour curdled material. Lavage, the sucking of ice-cold water and bismuth and soda and perhaps a counter-irritant such as a mustard leaf to the epigastrium is indicated if vomiting persists. Water or very light feeding is advisable. Protein broths and jellies may succeed when milk curdles. Precautions should be taken against recurrence. Chilling and fresh infections must be avoided. Light feeding may be necessary for some weeks. A change of air may be beneficial.

If an infection has set up a chronic gastritis, treatment is to restore tone, secretion and appetite by correcting blood and vitamin deficiencies and by raising the general health, physical and mental. Rest, open air, graduated exercise and the use of nux vomica, nitric acid, gentian or bismuth and soda if irritability is still present, or peptic aids may be considered. Diet must be light and easily absorbed. Protein broths, jellies and peptonized foods may be useful. Reddish gravy, light meats, fish, chicken are often better taken than the milky foods. A gastric test meal may give information concerning hypochlorhydria and indicate the need for hydrochloric acid.

LIVER DISTURBANCES, DUODENAL ATTACKS, AND PERIODIC ATTACKS OF ACIDOSIS

Attacks of acute catarrhal jaundice may occur. These are of an infective type and may be seen in small epidemics at times. A child has sudden jaundice with catarrhal symptoms, and the whole condition passes off with a few days' rest and dieting and sodium bicarbonate.

A more chronic state of liver disturbance was seen in a child of eight years, whose extreme pallor, yellowish tinge and dark circles under the eyes gave me a clue to her condition. She had suffered from constipation for a considerable time with a very poor appetite and headaches. She was irritable and there were urates in the urine, rough patches on the skin. She improved steadily with rest, dieting and on grey powder in varying doses. I gave her two grains three times a day for a week or so and then adjusted it according to the bowel action. She also had rhubarb and soda and taka-diastase. Rich fats were eliminated from the diet. She was given plenty of water, light meat jellies, junket, meats, toast, biscuits, stale white bread with little butter, syrup, jam and other plain foods with moderate milk and no cream. Fresh salads were allowed but fruit juices, especially the citrus ones, were limited.

In such cases excessive exercise does not lead to appetite but tends to increase the indigestion. Massage or mild exercise is often more suitable. Hæmoglobin, iron or liver may be needed, but most cases are not so anæmic as they look. A search should always be made for any chronic septic focus. Surgical measures can be adopted, if necessary, either for the teeth, the tonsils or the appendix. Gall-stones are not common.

Duodenal disturbances are very closely related to disorders of the liver and its ducts. The occurrence of jaundice indicates liver involvement. In my opinion duodenal attacks are very common in children. There is often a dispositional tendency to them although infective catarrhs (tonsillar and duodenal) are usually to be found. Some attacks appear to be due to chills and, if so, are metabolic only. From a study of actual cases those due to metabolic causes seem to outnumber the infective ones. The usual symptoms are loss of appetite, furred tongue, perhaps sickness, pain in the upper (duodenal) part of the abdomen and perhaps at the umbilicus, malaise, pallor, dark circles under the eyes and urates in the urine. There may be a tonsillitis, but there is usually no jaundice, though the stools are often pale and may be loose for a day or so. Signs of appendix trouble, such as tenderness or thickening, are absent. The child remains ill for two days or so and then gradually regains appetite and usual health.

Treatment consists of rest and warmth, bed for a day or two being necessary, with a light, non-fatty diet until appetite returns and medicines, such as bismuth and soda, if sickness is present, or sodium bicarbonate in considerable doses if it is well taken, together with an aperient, such as pulv. rhei co. or cascara, phenolphthalein or grey powder. It is not necessary to give any severe aperient. In fact, a sudden metabolic upset should be avoided. There is often a tendency to acidosis in such cases, and sudden metabolic upsets may bring about an attack.

Periodical attacks of acidosis (cyclical vomiting).—Acidosis has become fashionable and its attempted counteraction by glucose too common. It is therefore important to realize that aceto-acetic may appear in the urine and the smell of acetone in the breath in many children at the onset of an acute infection or after any severe metabolic upset. Periodic cyclical vomiting is a different matter. This consists of recurring attacks of acidosis and vomiting which tend to occur more frequently with repetition or if the irritating agent becomes more active. There are several causative factors. The attacks undoubtedly have something to do with the overloading of the liver and metabolism. Just before an attack the child often appears to be exceptionally well, with brilliant eyes and an unusually keen appetite. The overloading of metabolism has usually, however, been of a slow, cumulative kind, even if the attack has been finally determined by some sudden strain.

Acidosis is certainly related to disposition occurring more frequently in children of the exudative diathesis,[2] and there may be a certain amount of relation to allergy. They are live-wires, excitable, high-spirited children who use up their energy very freely and thus tend to disturb metabolism. Their metabolism is often of the irritable and unstable type, and it follows that excessive exercise, excitement, emotion or chilling and wrong diet will precipitate the attack. I sometimes feel that such children suffer from catarrh, not because of exposure to infection, but because their disposition leads them to metabolic disturbances, overloaded body fluids and a catarrhal state. In addition there are nervous as well as metabolic influences, and I have seen cases in which young children actually develop a real attack to gain their ends when thwarted. Both in recurring duodenal attacks and in recurring acidosis there is often a septic focus in the form of repeated tonsillitis, chronic appendicitis, or an enlarged mesenteric gland. The attacks of acidosis increase in frequency with the increased irritation from the septic focus and they cease or gradually diminish after the septic focus is cleared.

Treatment.—During an attack of acidosis it is important to give water and glucose by mouth and to stop the vomiting. Rest is important and morphine can be given if the child is very restless. If even water is vomited ice-cold water may be tried or lavage, and subcutaneous saline can be given until water is retained. Glucose can be given per rectum or in 5 per cent. solution intravenously up to 200 c.cm. Oxygen may be used subcutaneously. If there is any warning an attempt should be made to abort the attack by a free saline purge.

Preventive treatment is to keep metabolism unloaded by efficient elimination and the removal of anything which is likely to lower metabolic tolerance such as a septic focus or excessive exercise, excitement and eating. I often emphasize to parents these three E.'s. Diet needs regulation so that the child obtains full nourishment from proteins and carbohydrates with a considerable limitation of rich fats, especially milk fats and fish oils. Rich combinations, such as milk chocolate, chocolate creams, and toffee should be avoided. Vitamin D even in drop preparation is not always easily absorbed and may cause indigestion. Rest, regulation of mental effort and correct dieting, in fact, the control of the stresses on metabolism will naturally help to restore digestive tolerance and thus reduce the number of attacks.

Medicinal treatment to aid elimination is best carried out by a rhubarb and soda mixture given continuously over considerable periods but not to gripe or purge. Grey powder or magnesia may be used also. If vitamins are thought necessary they are best given in drop preparations, but it is often wiser to promote a steady appetite for natural foods and to let the child obtain vitamins in this way. Absorption counts for so much, and many vitamin preparations are given only to be passed unabsorbed or else to overload the liver and to hinder metabolic processes. Climatic influences also count. Damp inclement weather and east winds may precipitate attacks or even too much sun or bracing sea air may do so. Controlled exercise, ordered mental outlet, suitable weather exposure, all help to stabilize metabolism. A day in bed if the child has been overdone is a good thing.

Finally, we aim at a return of appetite for wholesome foods. The rhubarb and soda mixture will do this as well as anything, but sometimes a tonic like nux vomica with the rhubarb and soda or with a dilute nitric acid mixture is successful. Drop vitamin A and D preparations may be useful. With recovery a cumulative overloading of digestive tolerance must be avoided. This is not always easy because these cases may have a spurious hunger and a nervous habit of eating large amounts rapidly, and thus eat too much before they have developed a feeling of satiety. Sometimes the preliminary to a duodenal attack or an attack of acidosis is a state of apparent well-being with exceptional appetite. It is, however, a warning of the metabolic disorder which is to follow in a day or so and the hearty appetite is misleading.

SPASTIC COLON, ENLARGED MESENTERIC GLANDS

Spastic colon is also often associated with these duodenal and liver attacks. The distinguishing feature of this condition is the presence of a clearly palpable swelling in the right iliac fossa usually about the size of a sausage. This swelling may be brought up during an examination by palpation of the bowel. The condition is intermittent and is a nervous phenomenon indicating irritability. With it may be found Chvostek's sign of facial irritability—a sign which indicates either faulty absorption of calcium from the bowel or a mild chronic, toxic absorption. I see this sign so frequently in mild chronic digestive disorders in children that in spite of the opinions which have been expressed lately as to its valuelessness I am quite definite in regarding it as a clear indication for relieving bowel toxæmia and for the administration of calcium or, if necessary, of parathyroid extract. Spastic colon can also be seen in cases with some septic focus in the abdomen, such as an inflamed mesenteric gland tuberculous or otherwise. It may in sensitive children also occur as a result of stress and strain, mental and physical. It resembles, of course, a chronic appendicular thickening, but the distinction is usually easy. There is often mucus in the stools in these cases and it may be that the mucus is squeezed out by or is related to the spasm.

As regards *treatment*, dieting, mild digestive aperients and tonics, and the relief of stress and strain, and then a course of calcium usually relieve symptoms, but the tendency to spastic colon recurs for some time.

Enlarged mesenteric glands may be tuberculous or may not. I am referring here only to the comparatively mild and closed type of glandular inflammation. Such glands give rise to indigestion symptoms, perhaps with pain at the umbilicus and other signs of reflex irritation like spastic colon. They may cause digestive upsets and other symptoms very like those of appendicitis. Care must therefore be taken to exclude appendix trouble.

In *treatment*, rest is the first consideration. Nothing diminishes a gland and causes fibrosis and calcification, which is nature's method of cure, more quickly than rest and a consequent lessening of toxæmia. It is the stirring up of toxins by undue activity that causes their circulation and increases their harmful influences. Open air, skin ventilation, ultra-violet rays, good diet will bring about a cure in a few months. Tonics are indicated, a very suitable one being creosote with cod-liver oil emulsion and calcium. In a few cases which do not react to ordinary measures I use tuberculin, but only in very small doses and with very careful medical control. It is not a remedy to be used without experience.

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THE MEANING OF THE MOBILITY OF THE VISCERA

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THAT laboratory methods of investigation yield results that are not necessarily applicable to the living subject is well recognized; they must be viewed with caution and not accepted without question. Radiological methods are essentially of the laboratory type. They differ, however, in being carried out on man, almost exclusively in the X-ray departments of hospitals. This parentage has the distinct disadvantage that the study of the normal has been largely carried out on subjects with symptoms, and the study of the physiology has been, so to speak, a by-product in the essential work of detecting the cause of the trouble. On the other hand, it has had many advantages, not the least of which are the overwhelming vastness of the human material that has passed through the radiologist's hands and the check-up of findings both in the operating theatre and in the clinical after-history of the patients examined.

A short article can do little more than hint at radiological findings (detailed elsewhere[1]) which must revolutionize some of our conceptions on various subjects, more particularly some of the cherished descriptions, e.g. the skin markings of the abdominal viscera, which from time immemorial have been used as pegs on which to hang our knowledge. When radiology made possible the more or less accurate localization and mapping-out of the organs in relation to the abdominal wall, it was found that there were very wide discrepancies between what is thus seen in the living subject and the definite picture we learnt in our student days. The causes will be considered later, after the facts have been stated.

In the first place, the level of the dome of the diaphragm in the living subject is considerably lower than in the dead. At rest, it is on the level of the upper border of the 11th, and not the 8th dorsal vertebra, or thereabouts (Fig. 1). This provides an initial error of very considerable magnitude both in the chest and in the abdomen, and the skin markings are correspondingly discrepant. But what strikes the observer even more is the difference between the actualities of life compared with those seen in the dead subject: that those organs to which formerly we attributed more or less fixed positions and relations are in life not fixed but free to move. It was naturally assumed that viscera provided with a mesentery would be capable of movement within the limits of their attachments, but we were not prepared to find that those organs that had no such provision and which lay behind the peritoneum were almost, if not quite, as freely movable. Not only so, but it was found that many long stomachs extended far down below the average, even into the pelvis (Fig. 2, A, B, C). These were regarded as due to gastroptosis, and if the subject had symptoms, it was naturally

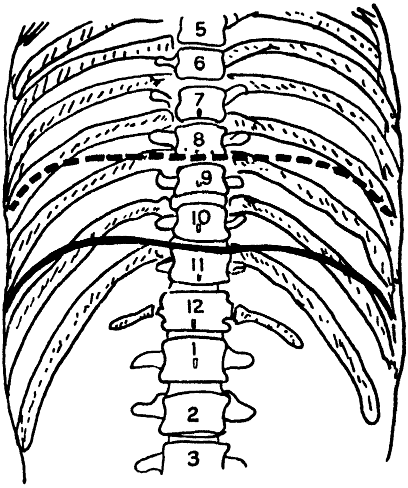

FIG. 1.—Tracing from a normal subject showing the usual level of the dome of the diaphragm in the mid-stage of respiration. The dotted line shows the position as given in most of the older anatomical textbooks. Some give the level as high as the 7th D.V.!

assumed that "ptosis" was the cause. Years of experience, however, and the demonstration of similar conditions in healthy students, made it impossible any longer to attribute symptoms to such divergencies from what was regarded as the normal. In others, again, we found quite a small stomach and, if we re-examined, possibly when conditions were different, that stomach might be of the average size and shape. When a subject became faint or frightened, we found that the tone of the stomach relaxed and the lower border dropped some inches, even down into the pelvis. Variations in tone are often associated with pathological changes, but they are not in themselves any more pathological than, say, changes in facial expression. In short, we could not define what was a "normal" stomach. An average "J" shape was usual, but we found many varieties in subjects who were perfectly healthy. There was not any justification whatever for saying that some were abnormal simply because they were different from our conception of what the normal should be. Moreover, we found that posture exerted an unexpectedly large influence on the shape and position. Even the relatively fixed points were found to be mobile; the pylorus, for

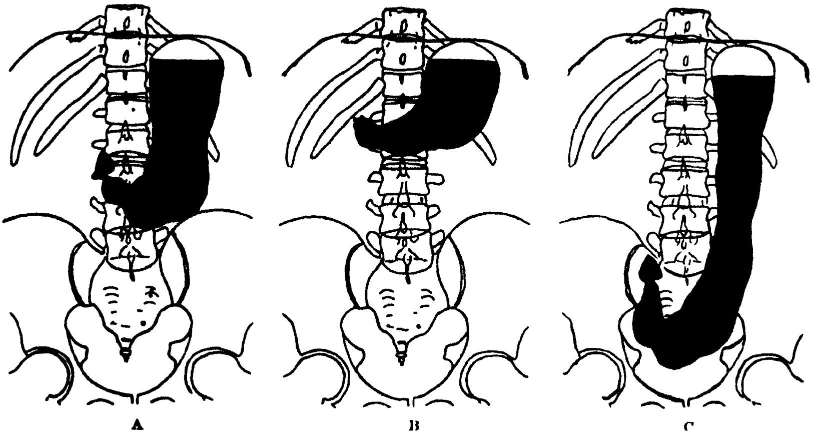
A B C

FIG. 2A, B, and C.—Examples of (A) the type of stomach as is usually seen; (B) the short so-called cow-horn shape; (C) a very long stomach, such as used to be labelled "gastroptosis." Many other types are found.

instance, was shown to move, with respiration and posture, within a circle of some four inches in diameter (Fig. 3), and, further, this displacement could be considerably increased by pressure and manipulation through the abdominal wall.

If a student is asked for the relations of the living stomach and answers in the set terms of the dissecting-room, he is probably incorrect, and possibly very far out. Before answering the question he ought to know the position of the patient, the phase of respiration, the type of stomach, the state of tonic action, whether distended by food, and various other factors that could not be determined. It is curious that in the dissecting-room the viscera conform to a more or less standardized pattern of relations, but this pattern does not obtain in life. It is subject to wide changefulness, not only from individual to individual, but from time to time in the same individual—the sinking sensation in the abdomen before a viva voce examination or the start of a race is due to loss of gastric tone and, in fact, the lower border of the stomach literally drops down in the abdomen, perhaps even into the pelvis, returning again when tone is restored with the concentration of mental and physical activity. In some normal subjects a long stomach reaches to the symphysis pubis or even lower. Such a stomach is sometimes found in men who are rowing in their college boats or training for other sports, and must be regarded as perfectly normal. Yet if such a man described his own stomach in the erect posture and gave its actual relations, he would have to mention the bladder, the cæcum, and the sigmoid ! This instance is, of course, an extreme, but it will indicate my point—there is no such thing as a standard normal pattern.

The mobility of the small intestine with its long mesentery is readily envisaged, but on anatomical grounds it would hardly have been expected that there should be the wide variations in the position of the cæcum that sometimes puzzle inexperienced surgeons. Radiologically, however, the range of possible excursion of the appendix is very wide and it may not always be covered by a circle of six or even seven inches in diameter centred on McBurney's point (Fig. 4). Anywhere within this range the appendix may be caught by adhesions resulting from inflammatory processes, but the normal free appendix and lower cæcum can move at the dictates of posture, abdominal movements, respiration and manipulation over quite a wide range.

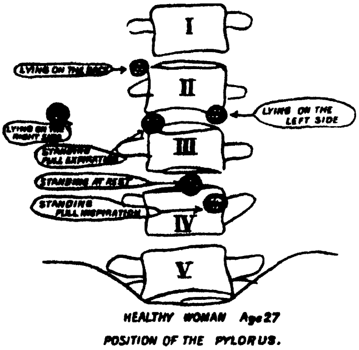

FIG. 3.—The position of the pylorus in a healthy subject plotted in from radiographs taken under various extremes of respiration and variations in posture.

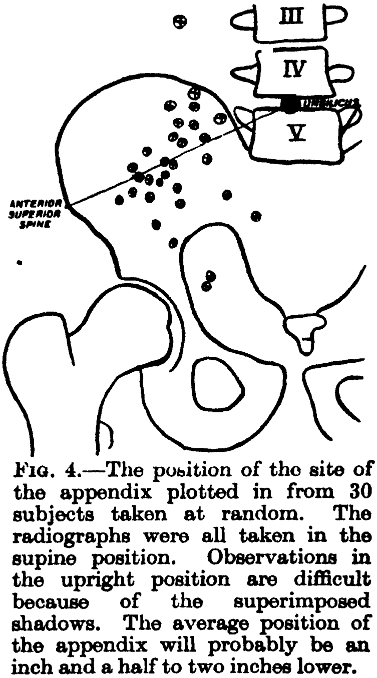

FIG. 4.—The position of the site of the appendix plotted in from 30 subjects taken at random. The radiographs were all taken in the supine position. Observations in the upright position are difficult because of the superimposed shadows. The average position of the appendix will probably be an inch and a half to two inches lower.

The absence of a mesentery, as is usual in the ascending colon, seems to have relatively little effect in limiting its movements. Even the difference in posture from the upright to the horizontal positions allows the hepatic flexure to rise a couple of inches, while forced respiration gives it an excursion that should be seen by anybody who retains any belief in the " mobile proximal colon " as a source of symptoms (Figs. 5A and 5B). The transverse colon, hanging from the lower border of the stomach by the transverse meso-colon naturally has a wide excursion with the lower border of the stomach. The splenic flexure is just as freely movable as the hepatic flexure, and its position varies greatly. Quite often in the upright position it is as low as the iliac crest.

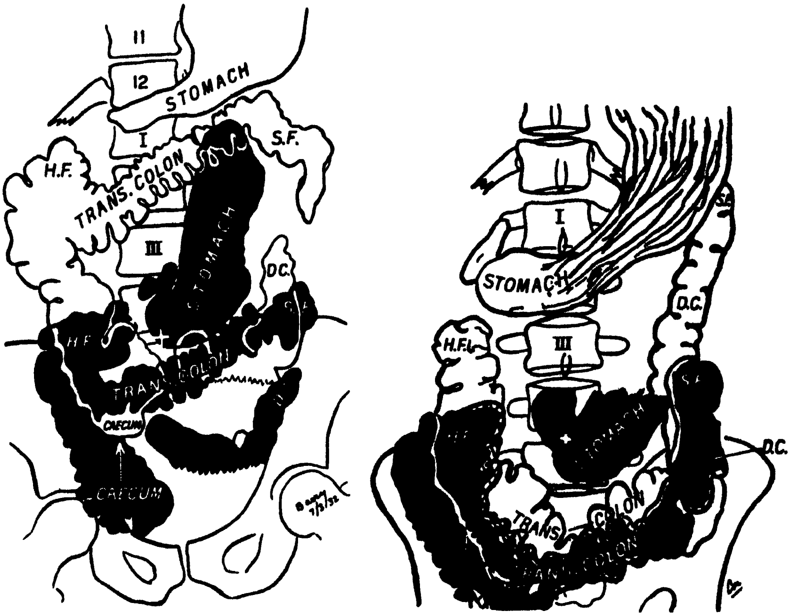

FIG. 5A.—From a medical student of rather tall, slim build. The excursion of the lower border of the stomach as measured on the abdominal wall was recorded as 9 in. In the radiographs, however, there was not quite such a big disparity, as the subject could not hold the stomach in the position into which he was able to jerk it by the action of his abdominal muscles (he was watching the effect of his movements with a looking-glass).

FIG. 5B.—A woman of 27. Note that, although the flexures of the colon show marked movement, yet the transverse colon hardly moves at all. Obviously it is anchored down into the pelvis by some adhesions. The transverse meso-colon must be unusually long to allow of such free upward movement of the stomach.

FIGS. 5A AND 5B.—Composite tracings from radiographs of two healthy subjects, showing the extremes of movement due to the combined effects of posture and respiration. The dark shadows of the viscera are traced from radiographs taken with the subjects standing and in the *extreme phase of inspiration.* The light shadows of the viscera are traced from radiographs taken with the subjects lying supine and in the *extreme phase of expiration.* Moreover, the abdominal muscles are retracted, causing a considerable movement in addition to that obtained by respiration alone. The extraordinarily wide range of movements indicated is somewhat exaggerated by the radiographic technique owing to the divergence of the X-ray beam.

In short, we find a degree of mobility of the viscera that must be difficult of acceptance by those who envisage the viscera in the terms of surface markings. The study of Figs. 5A and 5B should, however, be convincing. In demonstrations to students of anatomy I always outline the stomach and colon with barium and then make the subject laugh. He watches the imparted jerky movements himself with a mirror. He then does forced respiratory movements and adds jerky retractive movements of the abdominal muscles. The resulting acrobatic movements of the viscera invariably produce great hilarity among the students and are about as salutary a counter-blast as could well be imagined to the tradition of relative fixity that they get from the dead subject. It is, in fact, difficult to credit the movements of the stomach and viscera such as are recorded in Figs. 5A and 5B.

How are these facts explicable? The discrepancy of the level of the diaphragm in the living and dead subject is readily understood, for at death muscular tonus disappears entirely. Not only do the fibres lose their contractile power, but they also lose that other attribute, tonus, which enables a muscle to "stay put" and exert power, irrespective of actual contraction. There is not any satisfactory brief definition of tonus, and this description is open to objection, but it does give some idea of the inherent power which in life enables the diaphragm to maintain its position so that whether a subject stands, lies, or stands on his head, the diaphragm, in a healthy subject, retains approximately the same position. In death, this tonic action disappears and the collapse of the lung coupled with the weight of the abdominal contents in the recumbent position pushes the flaccid diaphragm up into the chest; and in this position it is fixed by the preparations used for dissecting purposes.

The complete absence of tone accounts for the caricatures of the stomach seen in the dead subject. Doubtless the formalin used as a preservative also plays a part, but the main factors influencing the shape of the dead stomach are the absence of tone and the fact that death and hardening take place in the recumbent posture so that the stomach tends to slide back into the upper posterior quadrant of the abdomen. Little or no clue is given in the dissecting-room to the mobility of the viscera without mesenteries, for the loose areolar tissue that lies between these organs and the posterior abdominal wall has lost all its nature, this fat has set, and we can only assume that this tissue is so lax in life that it allows a freedom of movement that seems almost incredible.

The extraordinary mobility and variation in form found in the living subject is a very different picture to that of the old textbooks. Are we to scrap our old descriptive anatomy as erroneous or are we to neglect the light that radiology throws on the problems of life? Something tangible must be taught, and how can this fluid type of anatomy, this entire absence of fixed points, this divergence from any set pattern that we see in the living subject, be conveyed to the student? Even more difficult, how can an examiner discover whether a student does or does not know his subject, when almost any variation is possible within the limits of normality? It is a problem that must be settled in some way, for the student must realize that the picture of the abdomen in the dissecting-room is a gross travesty and gives no conception of living conditions. It is a conception of the living, not of the dead, that the student must take with him from the dissecting-room if his anatomy is to be of any use to him. I do not see the way out yet except by a continuation of the usual descriptive teaching coupled with extensive instruction and X-ray demonstrations on the living subject so that the student may mentally endow the "dead bones" with life.

What are the practical applications of what we learn from the X-ray study of the viscera? When Lister made it possible to open the abdomen with relative safety, the surgeons of that day knew only the anatomy of the dissecting-room, the anatomy of the dead. Finding that the viscera were mobile, they naturally thought that such mobility was abnormal and that it must be associated with symptoms. A school of thought had grown up that attributed a symptom-complex to loose viscera in general and to that of certain organs in particular. What more natural than that this looseness should be corrected and that organs should be made to conform to the picture of the dissecting-room that was accepted as correct? The stomach was " fixed," and even shortened if it was deemed too long; the kidneys were " fixed," the " mobile proximal colon " was " fixed," the cesspool cæcum was plicated and "fixed," the colon was called by bad names, short-circuited and removed. The surgeon learned that the only way in which he could effectively " fix " an organ was by Nature's method, the formation of adhesions, and bitter experience taught him that the one thing he had most to fear in his end-results was adhesions that limited the movements of viscera. It is not pleasant to think of the sum of human suffering that must be attributed to the ghastly misconceptions of the lessons of the dissecting-rooms. It will form an instructive and pathetic chapter in medical history. This " -pexy " mania was still in full swing when X-ray work on the alimentary tract became a recognized method. No knowledge of the normal other than that of the dissecting-room was available. We saw a long stomach and said " gastroptosis "; we saw a colon low in the pelvis and said it was ptosed; but it was not long before we realized that the variations from our entirely arbitrary standards of normality were not necessarily connected with the symptoms from which the patient suffered. We slowly realized that, in reporting, it was unwise to mention these anatomical features. Although radiologists saw but little of the clinical side of the picture, they realized that clinicians, who saw less than they of the workings of the viscera, were not in a position to appreciate that anatomical anomalies were not likely to be the cause of symptoms. It was a case of groping, trying to find out the physiology and the pathology of the abdomen at one and the same time, and there was no guidance from the department of physiology.

What is the meaning of this extraordinary mobility, this wide laxity, this elasticity, both in form and position? We have been slow to learn, although for years we have realized that Nature may and does achieve perfect functional results in spite of apparently outrageous anatomical abnormalities. The mobility of the viscera was obviously normal and intentional; the fixation operations were ill-conceived, based on an entire misunderstanding of Nature's mechanics. For it must now be realized that all this fluidity of the abdominal anatomy is very definitely purposeful; it is more than purposeful, it is essential to Nature's methods. Nature's mechanics are not those of the workshop and the laboratory. Think of the vital difference between any of our mechanisms and those of the alimentary tract. Can we conceive of a mechanism that has no base plate, no fulcrum, no reciprocating or revolving parts and not a single fixed point from which to exert its force? Our machines conform to a formula and do repetition work in the same way every time. Can we think of any mechanism that will do repetition work in an endless variety of ways, automatically taking up for variations in load and in the consistency of the raw product with which it has to deal? There is absolutely no comparison between our mechanisms and those of Nature; we marvel that her mechanisms work so efficiently and we seek to learn the secrets.

The explanation is only partly available, but it will gradually be unfolded as we clear our minds of the facile descriptions that have passed from generation to generation as accepted facts. We cannot explain Nature's mechanisms in terms of ordinary mechanics, for they have hardly one factor in common. Think of it: a muscular tube without any fixed point between the mouth and the anus (unless a partial exception is made for the cardiac orifice that has an excursion with the diaphragm of some inches). The system is one muscular tube that, having no fixed points, can only exert pressures by contractions within itself. How it works still remains to a large extent unsolved. Naturally we think of peristalsis, for this is a type of muscular action which can be understood—a ring contraction travelling forwards and propelling the contents in front of it. And this does occur; it is a very vital factor, but it is not, in most parts of the tract, the usual propelling force; it is one that is held in reserve, one that is only called up when there is some difficulty to be overcome. Gastric peristalsis is sometimes visible through the abdominal wall, but only when there is extreme pyloric obstruction. Occasionally we see intestinal coils writhe, but only when they are in difficulty.

Very little is clearly known about the way food is passed along in ordinary conditions and how it is broken up in the duodenum; but it seems reasonably certain that in the upper parts of the tract, at any rate, the action of the muscularis mucosæ plays an unexpectedly large part. It seems clear that when the whole story is known, it will not be a simple one. Unless I am much mistaken it will be found that there are quite a number of mechanical expedients used, of which peristalsis, the action of the muscularis mucosæ and difference in pressures brought about by combined muscular actions are but a few. It will be found that Nature uses them either singly or in various combinations according to her need. Nature has not any fixed standard for propelling and mixing the intestinal contents any more than she has any fixed anatomical standards. One thing, however, is certain: in order to function efficiently, she demands absolute freedom of movement, and this lesson has been very slowly learnt, in spite of the surgeon's observations that adhesions were the one thing that was liable to lead to bad operative results. The presence of fixed points within the abdomen causes symptoms, whereas even the grossest anatomical abnormalities are quite compatible with perfect function and freedom from symptoms.

It would be easy to cite many examples of perfectly healthy students who, when examined for demonstration purposes, showed conditions which judged by our standards of mechanics must obviously cause trouble, and yet these students are perfectly fit. Had these conditions been discovered in subjects with symptoms, the radiologist would undoubtedly have reported that the cause was obvious, and no surgeon would have had any doubt that it was his duty to restore the viscera to a form that would be in conformity with the accepted pattern. The patient's symptoms might even be relieved by the procedure, but this does not prove that the correcting of the displacement was the responsible factor. It is more probable that the surgeon removed some slight and almost unnoted adhesion that was hampering free mobility. Nature can, in my experience, achieve perfect function in spite of the grossest departures from what was formerly regarded as anatomical correctness, provided she has a free hand. Anomalous, even grotesque, distortions of the anatomical picture of the viscera are quite compatible with perfect health.

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ON GULL'S DISEASE (SPONTANEOUS MYXŒDEMA OF THE ADULT)

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THE following article was first given forth in the form of a clinical lecture dealing with a case of Gull's disease (spontaneous myxœdema of the adult), with a history of pre-myxœdematous arterial hypertension and of the return of the blood pressure to lower levels on the development of the severe hypothyroidism. The patient exhibited, then, a full-fledged picture of an important endocrinopathy and in addition interesting complications and associated processes. Acquaintance with the severe form of this endocrine disorder cannot fail to make a deep impression upon any worker in clinical medicine, and consideration of the symptoms and signs will provide the clues for the recognition of the milder forms of the same endocrine deficiency which unfortunately are very often overlooked or misinterpreted in general practice.

CASE HISTORY

The patient, male, a white shipping clerk, 45 years of age, was admitted to the Osler Clinic of the Johns Hopkins Hospital (service of Professor Warfield T. Longcope) on December 20, 1933.

Chief complaints: Drowsiness, loss of vigour, general stiffness and aching, and rapid gain in weight for one year, and inability to continue occupation for preceding two months.

Family history: No disorders similar to that of the patient known to have existed.

Past history: Measles, mumps, chicken-pox and whooping-cough in childhood. No history of typhoid fever, pneumonia, acute rheumatism, or venereal infections. In 1920 he was operated upon for fistula in ano; four fistulous tracts (on the right side) lateral from the rectum, one of them at the root of the scrotum, were incised under local anæsthesia and packed with iodoform gauze, followed by satisfactory recovery. He was then referred to the Phipps Tuberculosis Dispensary for general study, where Dr. Cohen thought his lung apices might be fibrotic, though he was emphysematous and obese and an X-ray chest-plate proved to be negative. There were evidences also of well marked oral sepsis. The gonads were negative and the thyroid isthmus was palpable. Because of the obesity in association with hypotrichosis, transverse crines, tapering fingers, and acrocyanosis, hypopituitarism seems to have been thought of as a possibility, but the endocrine functions were not further investigated at that time. The patient has always been a steady worker, and a hearty eater. He has not used alcohol, but has smoked cigarettes, usually a package in a day and a half.

Present illness: Except for excessive weight for many years and for several attacks about two years ago of precordial pain on exertion, relieved by belching, the patient thinks that his health was excellent until one year ago when he began to notice unusual drowsiness in the latter part of the day, often " dropping off " to sleep if he sat down. This drowsiness gradually became more pronounced and was associated with a feeling of loss of energy; on awaking in the morning he no longer felt fresh and vigorous. A few months later he noticed shortness of breath on exertion and six months ago his ankles were observed to be swollen in the evening. About the same time he became obstinately constipated (though always regular before), noticed general stiffness of his joints, and began to gain weight rapidly, adding some 20 or 25 pounds during the past half-year, necessitating the purchase of shirts, collars and trousers of larger size. He noticed that he perspired less, was abnormally sensitive to cold and lost sex power. Four months before admission all his upper teeth and most of his lower teeth were extracted in the hope of securing relief, but without noticeable improvement afterward. Two months before admission he was forced to give up work because of excessive drowsiness, general stiffness and soreness, and dyspnœa on exertion. He had noticed no memory defect. His voice became thick and hoarse and his speech and general bodily movements were slowed up.

Physical examination: The principal positive findings include: Slight fever (99° to 100° F.), bradycardia (pulse 60–72), blood pressure 120 to 148 systolic, 80 to 100 diastolic, excessive weight (215½ lbs.) for his height (5 ft. 7½ ins.) with fairly uniform general distribution of the fat, sleepy apathetic facies, narrowed lid slits, impaired mastication, dental caries, and gingivitis, large lips and tongue, puffiness of face and of backs of hands and feet, short neck, pads of fat above the clavicles, and in the axillary and supraspinous regions, brawny buttocks, general hypotrichosis and transverse crines, dry, pale, thick, scaly skin, brittle nails, nasal obstruction with mouth breathing, abdominal type of respiration, emphysematous type of thorax with moist râles at bases of lungs, moderate enlargement of the heart with apex beat lateral from the mammillary line, " distant " heart sounds, slight increase of liver dullness, right-sided hydrocele, slight pitting œdema over the tibiæ, slowing of speech and voluntary movements, sluggish deep reflexes, and bilateral impairment of hearing. Palpation in the region of the thyroid revealed nothing but small firm cords of tissue. *Reports of laboratory tests.—Blood:* R.B.C. 4,930,000; Hb. 100 per cent.; W.B.C. 5,500; differential count normal; platelets normal; Wassermann reaction negative; no parasites; non-protein nitrogen 36 mgm. per cent.; blood sugar 105 mgm. per cent.; total protein 7·6 g. with A/G ratio 66 : 34; blood calcium 10·2 mgm. per cent.; blood phosphorus 4·0 mgm. per cent.; blood cholesterol 272 mgm. per cent.; urea clearance about half normal. *Urine:* Output 650 c.cm. with water intake of 1,000 c.cm.; sp. gr. 1,018; trace of albumin; no sugar; no casts; phthalein output of "delayed type," perhaps because of slowed circulation time (26·6 seconds on decholin test). *Stomach contents:* Free HCl 0; total acidity 10 ac. per cent. *Fæces:* Negative. *Basal metabolic rate:* On a series of tests this varied between minus 22 per cent. and minus 40 per cent.; the average level was minus 30 per cent. *Glucose tolerance test:* Decreased tolerance but without glycosuria. *Vital capacity:* 2·25 litres (43 per cent. of normal).

X-ray reports (Drs. Waters and Seeds).—*Skull:* Cloudiness of right antrum and right ethmoids; sella normal. *Chest plate:* Lungs clear; no hydrothorax. *Pelvis:* Beginning hypertrophic osteoarthritis of hip-joints. *Teleröntgenogram:* M.R. 4·7; M.L. 12·3; A. 6·5.

Reports of special examinations.—Electrocardiograms (Dr. Tilghman): Normal sinus rhythm; P-R interval ·21; duration of QRS normal; left ventricular preponderance; P waves small and flattened in leads I and II, iso-electric in lead III; prolonged conduction time (first degree of heart block); QRS complexes in lead II of low voltage, slurred in leads I and III; T waves biphasic in leads I and II, iso-electric in lead III. *Ear, nose and throat examination* (Dr. J. D. Ware): Nasal obstruction with mouth breathing due to hypertrophied turbinates and deflected septum; cloudy antrum and ethmoids on the right side in X-ray plate; large amount of cerumen removed from both ears; ear drums normal.

DISCUSSION OF THE CASE

The endocrinopathic disturbances.—The rapid gain in weight during the past year, the prominence of drowsiness, the obstinate constipation, the loss of vigour and slowing of movements, the puffiness of the expressionless face, the dry, harsh, thickened, scaly skin with absence of perspiration, the sensitiveness to cold, the sparseness of the body-hairs, the brittle nails, the hoarse voice, the sluggish reflexes and the atrophy of the thyroid gland—all these taken together are characteristic of a severe hypothyroidism, confirmed by the well marked lowering of the basal metabolic rate and the hypercholesterolæmia. Since these symptoms developed rapidly at the age of 44 in a man who was considered healthy before, the picture is that of Gull's disease (so-called "spontaneous myxœdema of the adult"). It should be borne in mind, however, that the patient has been obese for many years, and the possibility that a mild hypothyroidism had existed for nearly a decade before the development of the severe deficiency is quite conceivable, though it cannot be proved. Nor can we be sure that the patient did not have at least some congenital thyreo-aplasia, followed later by progressive atrophy of the gland. To the relation of the thyroid deficiency to the circulatory disturbances in this patient I shall refer later. There do not seem to be other endocrine disturbances of note; the gonads are of normal size and the sella turcica is normal.

In some cases of endogenous obesity it may be difficult to tell whether the cause lies in hypopituitarism or in hypothyroidism, though studies of the basal metabolic rate and of the results of tests for the specific dynamic effect of protein (due apparently to its content in certain amino-acids, especially glycocoll and alanin, which act as catalysts and increase the oxidative processes in the cells) will differentiate. In obesity due to hypopituitarism the basal metabolic rate may be practically normal, but there is diminished specific dynamic effect of protein; in obesity due to hypothyroidism the basal metabolic rate is definitely lowered, but the specific dynamic effect of protein is normal; in obesity associated with both hypopituitarism and hypothyroidism, there is lowering of the basal metabolic rate and also diminished specific dynamic effect of protein.

To test for this specific dynamic effect of protein in a thoroughly reliable way, a rather complicated technical procedure is necessary (direct or indirect calorimetry). A very simple method has, however, been employed to give clues to the specific dynamic effect. In this, the basal metabolic rate is first determined in the ordinary way, followed next morning by a test meal consisting of the whites of three hard-boiled eggs, a thin slice of toast and a cup of tea without sugar, cream or milk; after a rest of two hours, the basal metabolic rate is again determined. In hypopituitarism the average specific dynamic action is to increase the basal rate only 4·47 per cent., whereas in controls the average increase is 16·3 per cent. Goldzeiber and Gordon (1933) found the specific dynamic effect below 10 in 86 per cent. of pituitary cases, whereas it was below 10 in only 21 per cent. of controls. Though not absolutely pathognomonic it is believed by some that this test may be of considerable help in the differential diagnosis of hypopituitarism from conditions with which it might be confused. I am somewhat doubtful about the reliability of this simple method of determination of specific dynamic effect. Certainly, in accurate research work the more complicated methods should be employed.

The circulatory disturbances.—In the ward note made upon this patient it is stated that the teleröntgenogram and the EK tracing seemed to be quite typical of the so-called "myxœdema heart." This term was coined in 1918 by Zondek who, on studying the heart in the more severe cases of myxœdema, found: (1) dilatation of both the right and left sides of the heart and of the aorta; (2) slow, worm-like contractions of the walls of the heart on röentgenoscopic examination; (3) especially sharp contours of the heart in teleröentgenograms; (4) decrease in size (or loss) of the P and T waves in electrocardiograms; and (5) loss of the A-wave in phlebograms, in addition to other minor changes. Zondek also found that thyroid medication was followed by well-marked shrinkage in the size of the heart the slow, worm-like contractions disappeared, the heart rate became accelerated, and the waves in the EK tended to regain a normal appearance. Since Zondek's fundamental observations, further studies (largely confirmatory) of the heart in myxœdema have been made by many clinicians, especially in America, among them Fahr (1925), Reid and Kenway (1932), Ayman, Rosenblum and Falcon-Lesses (1932), Gotten (1932), Walker (1933), and Lerman, Clark and Means (1933). Moreover, the circulation time is prolonged in myxœdematous cases, in our patient to 26·6 seconds. The shrinkage in the size of the heart on treatment with thyroid extract is usually marked within a fortnight, but the heart may continue to decrease in size for several months until of approximately normal dimensions provided there is no atherosclerotic or other cardiac complication. The dilatation of the heart in myxœdema seems to be due to loss of tonus and to œdema of the heart muscle, the changes in the EK to similar alterations in the conduction system. It will be interesting to see what changes occur in the size of this patient's heart under thyroid treatment. The occurrence, however, of actual congestive failure of the heart seems to be relatively rare in uncomplicated myxœdema. In the patient described there was, apparently, some congestive failure, which responded, as you have heard, very well to treatment with digitalis and rest.

Another circulatory feature in this patient deserves especial attention. When he was under medical care a few months before admission to the hospital, there was apparently a mixture of true cardiac œdema and of myxœdema, and on one occasion the blood pressure was found to be 180 systolic and 100 diastolic; under infusion of digitalis, part of the œdema (cardiac ?), but not all of it, disappeared and the blood pressure fell to 145 systolic, 90 diastolic. Two years ago this patient suffered from precordial pain on exertion, relieved by eructation of gas, thus suggesting angina pectoris due to coronary or aortic disease. Moreover, on examination here on admission, it was impossible to detect pulsation in the dorsal arteries of the feet, though the pulsations in the popliteal and posterior tibial arteries were discernible. Considering all these data together, it would seem probable that before the onset of the myxœdema there had been a development of an atherosclerotic process associated with chronic arterial hypertension.

It has been known for some time that hypothyroidism has a compensatory effect in arterial hypertension and in angina pectoris. Indeed, because of this observation, some cardiologists have been bold enough to resort to total surgical ablation of the normal thyroid gland in patients with congestive failure or with severe angina pectoris, who do not respond satisfactorily to other forms of treatment. Thus, in 1933, Blumgart, Riseman, Davis and Berlin made a report upon the results of total ablation in ten patients; in two of these with angina pectoris before operation there was no return of the attacks even when six times the amount of work that formerly produced attacks was performed, and in the cases of congestive failure that were operated upon much more exertion became possible without palpitation, dyspnœa, or craving for water. They advise ablation of the thyroid only when the operative risk is fair and they think it should not be performed when there is active coronary disease, active infection, evidence of repeated pulmonary infarction, or rapidly progressive luetic or tuberculous disease. Means of Boston (1933) has suggested that the coronary arteries of the flabby heart of myxœdema may be capacious enough for a low level of cardiac work, but not for the increased tone and work of the heart that accompany normal thyroid activity. He warns against pushing the treatment of myxœdema with thyroid preparations if precordial pain or discomfort should develop, but advises then stopping the thyroid medication for a few days and giving a smaller dose when it is begun again. In such cases he thinks the clinician may be compelled to steer cautiously between " the Scylla of myxœdema and the Charybdis of angina pectoris," and must sometimes be content with a basal metabolic rate that remains 15 or 20 per cent. lower than he would like! The bearing of these studies upon the situation in the patient before you is obvious.

DIAGNOSTIC CONCLUSIONS

In view of the data accumulated, the following multi-dimensional diagnosis would seem to be justifiable: (1) Spontaneous myxœdema of an adult (Gull's disease) with characteristic changes in the skin and its appendages, generalized obesity, obstinate constipation, drowsiness, loss of vigour, sensitiveness to cold, marked decrease of velocity of blood (circulation-time) and with " myxœdema heart "; marked retardation of the basal metabolic rate; hypercholester-olæmia; striking diminution of the vital capacity of the lungs. (2) Atherosclerosis with history earlier of (*a*) marked arterial hypertension (B.P. 180/100) and subsequent fall of blood pressure on development of the myxœdema; (*b*) paroxysmal precordial pains suggesting angina pectoris; (*c*) loss of pulsation in the dorsal arteries of the feet; and (*d*) recent mild congestive circulatory failure that became less under rest and digitalis. (3) Bilateral nasal obstruction due to hypertrophy of the turbinate bones and deflected septum; cloudiness of right antrum and ethmoids. (4) Chronic pulmonary emphysema. (5) Achlorhydria gastrica. (6) Dental caries, gingivitis, and impaired mastication. (7) Slight hypertrophic osteo-arthritis on X-ray examination (though the general aches and pains are most probably due to the hypothyroidism). (8) Right hydrocele. (9) Bilateral impairment of hearing (due to impacted cerumen).

TREATMENT OF THE PATIENT

The *circulatory insufficiency* with congestive heart failure has responded well to rest and the administration of digitalis. Because of the atherosclerotic myocardiopathy to which the congestive failure seems to have been due (perhaps wholly apart from the myxœdematous heart) it will probably be advisable to maintain in this patient the measures that we usually adopt in such cases (adequate rest; five small meals daily rather than three large meals; limitation of the total fluid intake to 1,200 to 1,500 c.cm.; small doses (¾ grain) of powdered digitalis leaf thrice daily for three weeks in each month).

The *myxœdematous state* should respond well to thyroid treatment. Indeed, the transformation of such patients under treatment is one of the marvels of modern therapy. With desiccated thyroid, tablets of thyroid extract, or Kendall's thyroxin, the basal metabolic rate increases because of catalytic acceleration of the chemical processes in the body, and the symptoms of hypothyroidism can be made to disappear within a few weeks. The dilated heart shrinks visibly from week to week on röentgenoscopic examination. It is usually wise to begin with relatively small doses of the thyroid preparation selected (say ½ grain of desiccated thyroid once or twice a day) and to increase the dosage to tolerance; as a rule for each milligram of thyroxin (or its equivalent) administered an increase of 2 per cent. in the basal metabolic rate may be expected. This patient has thus far received only one milligram of thyroxin. The administration will be most cautious in this patient because of the earlier symptoms that suggested the possibility of angina pectoris; moreover, a few hypothyroid patients are allergically hypersensitive to the animal protein of the thyroid preparation. After the myxœdematous symptoms have disappeared one may give a maintenance dose of desiccated thyroid by mouth for months or years. Reduction of the obesity can be hastened by use of the anti-obesity diet of Evans and Strang, or by the bananas and skimmed milk diet of Harrop.

After Kocher and the Reverdins had recognized the identity of the symptoms in post-operative cachexia strumipriva with those of spontaneous myxœdema, Sir Victor Horsley, and also Bircher, in 1889 attempted a cure by the implantation of thyroid gland but without success as the tissue would not grow. With the extraordinary success of G. R. Murray's subcutaneous administration of thyroid substance (1891) and, later, in 1893 of oral administration (Vermehren; Howitz), attempts at surgical implanation were abandoned and were regarded as of merely historical significance. Of course, if transplanted thyroid tissue could be made to grow and to function in hypothyroid patients, there would be no necessity for life-long administration of thyroid preparations by mouth. Recently, Dr. Harvey Stone of this hospital has conducted experimental work which makes it seem probable that surgical grafts of thyroid tissue can be made to grow, and Professor Longcope and Dr. Stone have agreed that the attempt is worth a trial in this patient. The technique will consist of culturing normal human thyroid tissue in the patient's own serum (or plasma) preparatory to implantation. After determining the rise in the basal rate obtainable by administration of thyroxin, the latter will be discontinued, the basal metabolic rate will be allowed to return to its low levels, and then the implantations of the tissue cultures will be made. Let us hope that they will grow and function!

Endocrine products other than thyroid preparations are not of any value in the treatment of uncomplicated myxœdema. The studies of Weinstein and Marlow in this hospital show no beneficial effects from suprarenal cortical preparations in either hyperthyroidism or hypothyroidism.

The *nasal obstruction* in this patient is sufficiently lessened by the use of two drops of solution of 1 per cent. ephedrine in oil as often as necessary. The swelling of the nasal mucosa may undergo reduction on thyroid treatment. Operations on the nasal septum may be avoidable. The *voice* ought to become less harsh after thyroid medication. The *impairment of hearing* has disappeared with removal of wax from the external auditory canals; but it is to be remembered that myxœdematous patients are sometimes hard of hearing because of swelling of the mucosa of the Eustachian tubes. For the *achlorhydria gastrica* the patient should receive dilute HCl before and after meals. The *constipation* will doubtless disappear under the thyroid treatment, though a little mineral oil at bedtime may be required. The *mouth condition* can be improved by treatment of the gingivitis and the dental caries and by suitable prosthetic dentistry. The aches and pains thought by the patient to be rheumatic may be due to the hypothyroidism; at any rate, such general stiffness and soreness in hypothyroidism often disappear under thyroid therapy.

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SOME ASPECTS OF ENURESIS

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INCONTINENCE of urine is one of the most common complaints of childhood, and is worthy of consideration not only on that account, but also because although much has been written on the subject and many lines of treatment have at various times been recommended, it remains a symptom which causes much misery to children and despair to parents. When a child is brought for enuresis there are various points in the history to which careful attention must be paid. It is not enough to know that the child wets the bed during the night. We must know whether incontinence also occurs during the day, or whether by day there is frequency, for if this is the case, it becomes more likely that there is some underlying organic cause for the incontinence. It is also important to know if enuresis has persisted since birth, or whether the child had been able at some period to control his bladder, for in the former event all that may be needed is diligent training, whereas in the latter there may be some psychical element to which attention must be given, or there may be some associated disorder, such as threadworm infection, or chronic indigestion, which must be corrected before the bed-wetting will cease. Then, too, before advising treatment it is as well to find out what measures have previously been adopted, for otherwise it may happen that our instructions will have already been tried and found unsuccessful.

Just as important as a thorough history is a complete examination of the child, for bed-wetting is at times a symptom of disordered health in some other part of the body; for instance, enuresis is sometimes associated with chronic disease of the tonsils and adenoids, particularly when these are giving rise to restless sleep and snoring. It is almost unnecessary to point out that whenever a child is brought for enuresis, the urine must be examined, for although in the majority of cases the urine will be normal, this preliminary examination will occasionally throw unexpected light on the cause of the condition.

ORGANIC ENURESIS

The diagnosis of functional enuresis can only be made after organic causes have been excluded, and therefore we may consider these first. There are three diseases in children associated with the passage of an excessive amount of urine, and in each bed-wetting is likely to be a prominent symptom. They are diabetes mellitus, diabetes insipidus, and chronic nephritis. Diabetes mellitus in childhood tends, until the child comes under treatment, to be an acute disease, and often the classical symptoms of wasting, thirst, and polyuria have only been present for a few weeks before the child comes for treatment. As a rule, these classical symptoms are prominent, so that a careful history will prompt the examination of the urine for sugar, and enable the correct diagnosis to be reached. Diabetes insipidus is admittedly rare, but roughly a quarter of the cases arise in the first decade, and this disease must be borne in mind when a child is brought for enuresis. The two chief symptoms are great thirst and a copious output of urine of low specific gravity, and occasionally there are other signs of a disordered hypothalamo-pituitary function, such as obesity with defective development of the genitalia. The majority of cases in children are associated with syphilitic infection. With regard to chronic interstitial nephritis, this may be a congenital condition, and enuresis will then have persisted from infancy. In addition to a history of thirst and polyuria, and the presence of a variable amount of albumin and perhaps casts in a urine of low specific gravity, chronic interstitial nephritis interferes with growth, and the child is likely to be thin and dwarfed, and the skeleton may show the deformities of renal rickets.

Then there is another important class of organic enuresis, namely, children who have some congenital deformity of the urinary tract. Within recent years this group of cases has received increasing recognition, and with the help of modern methods of urological investigation the true nature of many conditions that were previously labelled as chronic pyelitis and idiopathic hypertrophy of the bladder has come to light. Although enuresis is not necessarily a symptom in these children, it is nearly always present, and is likely to be both diurnal and nocturnal. When the outflow of urine from the bladder is obstructed, the parents may have noticed that the stream is feeble and small, in fact, the child is constantly dribbling urine. In some of these children the bladder can be felt in the hypogastrium, not merely dilated, but thickened as well, giving a sensation on palpation not unlike an enlarged uterus. It should be a rule that when a child is brought for enuresis the hypogastrium should be carefully palpated, for if the bladder can be felt, and the child cannot empty it properly, it can be safely assumed that the enuresis is no mere functional condition.

The cause of congenital hypertrophy of the bladder is likely to be different in the two sexes. Although phimosis has been suggested as a cause, it may be doubted if it ever gives rise to back-pressure effects on the bladder, but a pin-hole urinary meatus may certainly cause difficulty in micturition. More often in boys hypertrophy of the bladder is due to obstruction in the posterior urethra by valves formed from the mucosa in connection with the verumontanum, or perhaps by the mucosa forming a diaphragm stretching across the urethral lumen. The presence of urethral valves in boys was first demonstrated by Young[1] and his colleagues, and in a few cases demolition of the valve by surgical means has been undertaken with success; but, unfortunately, it often happens that back-pressure effects on the kidneys are already pronounced at birth, and death from uræmia may come about when the child is only a few weeks old. Other children have survived for a few years, possibly because the degree of valvular obstruction was less severe, and in these there may be scope for surgical intervention. It is perhaps worth while to mention that the valves are so constructed that while they prevent the passage of urine, there may be little or no difficulty in passing a catheter up into the bladder.

Congenital hypertrophy of the bladder is less common in girls, and valve-like structures in the female urethra have never been satisfactorily demonstrated. When investigation has failed to reveal any organic obstruction either at the neck of the bladder or in the urethra, the hypertrophy has been supposed to be due to a neuro-muscular inco-ordination between the sphincter and detrusor muscles of the bladder—a state of affairs that may be compared with what is thought to happen at the recto-sigmoid junction in Hirschsprung's disease. It is as yet too early to say whether or not resection of the presacral nerve for these bladder cases would be as helpful as the similar operation of sympathectomy has been thought to be in children with megacolon; but Learmonth[2] has recorded improvement following neurectomy in older persons with spasm of the neck of the bladder. Before leaving these cases of enuresis associated with dilatation and hypertrophy of the bladder, it must be mentioned that in both sexes spina bifida of the lumbo-sacral spine has sometimes been a concomitant condition, which to some extent supports the view that a dysfunction of the nerve supply may account at times for hypertrophy of the bladder. Mertz[3] has recorded an improvement in the enuresis following laminectomy and removal of fibro-fatty masses which were compressing the nerves in the meningeal sac of the spina bifida.

Whatever be the cause of the obstruction to the flow of urine from the bladder, the effect on the urinary apparatus is disastrous. The ureters eventually become so distended and tortuous as to resemble coils of small intestine, bilateral hydronephrosis develops, and the kidney tissue undergoes chronic sclerosis. After a variable period, death occurs from uræmia. A feature common to all the congenital deformities of the urinary tract in childhood is the tendency sooner or later for infection by the *B. coli* to occur. This complication will at first be diagnosed as acute pyelitis, but as a rule the response to the usual methods of medical treatment proves unsatisfactory; the acute symptoms may subside, but the urine continues to contain pus and organisms, and enuresis, if not previously present, is likely to appear. When "acute pyelitis" proves refractory to thorough medical treatment, the possibility of some urinary tract deformity should be suspected, and the child should be investigated from this point of view. Occasionally help may be obtained by X-raying the child after filling the bladder with a solution opaque to X-rays (such as sodium iodide 13·5 per cent.). This reveals the bladder outline, and when the ureters are dilated and in free communication with the bladder, by raising the child's pelvis the fluid will sometimes regurgitate from the bladder into the ureters, and so a pyelogram may be obtained. In other cases intravenous pyelography or cystoscopy and pyelography after catheterization of the ureters may throw light on the underlying condition. Such conditions as stenosis of one or both ureters at their upper or lower ends, double ureter, horseshoe kidney, and so on, may by these means be revealed.

Unfortunately, even when the nature of the deformity has been revealed it may not be amenable to surgical correction. If infection of the urinary tract persists, the urine can sometimes be rendered sterile by giving a ketogenic diet, for it has been shown that the elimination of β-hydroxybutyric acid in an acid urine is inimical to the growth of *B. coli*. The principles of this diet include a high intake of fat with a minimum of carbohydrate, and not unnaturally it is sometimes difficult to persuade children to tolerate a diet of this sort. When it is decided to make use of a ketogenic diet for a child, it is more likely to be successful if carried out in a hospital or nursing home, under conditions of skilled nursing.

FUNCTIONAL ENURESIS

It must be admitted that the majority of children who suffer from enuresis do so for no apparent organic reason. Continence during the night is a habit which has to be acquired, and most children can be trained to keep their bed dry by the time they are two years old; but some children take longer than others, and one would not speak of functional enuresis under three years of age. Actually children are usually brought for treatment of this condition after they are five years old. By this age, the incidence of enuresis is not high; in an inquiry among several large residential homes for poor-law children, totalling over 5,000 children between the ages of 5 and 15 years, I found the incidence of nocturnal enuresis to be approximately 5 per cent. Roughly three boys were affected for every two girls.

Although a routine examination of the urine must be done in all cases, it is seldom that any abnormality will be found. Hyperacidity of the urine has been blamed, but is more likely to give rise to frequency than incontinence; in any case the excessive acidity can soon be reduced with potassium citrate. The presence in the urine of uric acid or oxalate crystals may also cause frequent emptying of the bladder, and will call for the use of alkalies, but it is unusual for these crystals to cause enuresis. Dr. Robert Hutchison has pointed out that in some children with enuresis the amount of urine excreted during the night is greater than that passed during the day, which is the reverse of what normally happens.

There is no doubt that local causes of irritation may assist in keeping up enuresis. Threadworms are important in this respect, although whether they operate solely by producing local perineal irritation at night-time seems doubtful. It is at least as likely that the catarrhal state of the bowel, of which they are evidence, promotes a degree of nervous exhaustion and thereby makes it more difficult for the child to acquire proper nervous control of the bladder. Other nervous habits, such as tic movements, are likely to exist at the same time, and neither they nor the enuresis are likely to clear up until the threadworm infection has been removed and the health of the bowel improved. Constipation is another common symptom which may need attention. Enlarged and septic tonsils and adenoids, and the irritation of carious teeth, may be factors by disturbing healthy sleep. Occasionally one finds that heavy suppers or copious drinks are given before bedtime, and that when these are stopped the enuresis ceases. It has recently been suggested that enuresis may sometimes result from the child's hypersensitivity to the material of his bedding, and that good results may follow the substitution of the feather pillow and horsehair mattress by bedding stuffed with a vegetable fibre.

It is doubtful if simple phimosis is a cause, although the irritation of secretions retained under the prepuce may be a factor. Enuresis sometimes ceases after circumcision, but the operation is no panacea; indeed, it often has no effect, and therefore should not be advised unless there is some evidence of preputial irritation.

TREATMENT

General management.—The diet should be easily digestible, and should be free from coarse foods that are likely to leave a large residue in the bowel. The last meal should be a light one taken at tea-time; the amount of fluid at tea should be restricted to a cupful, and no drinks should be given after tea. It is important to make sure that the bladder is properly emptied at bed-time, and if it is found that the bed is wet within an hour or so the child should be got out about half an hour after going to bed and be made to try to pass urine again. When the wetting occurs later in the night, an attempt should be made to try to determine roughly at what time the wetting takes place, so that the child may be roused before the accident happens. If it proves impossible to time the child in this way, he should be wakened regularly at 10 o'clock to pass urine. The waking must be done thoroughly, for the child must understand why he is being roused, otherwise he may only incompletely empty the bladder, in which case he might just as well not have been disturbed. As a general rule, a child should not be roused more than once during the night.

There is no doubt that the psychical aspect of treatment is of great importance. Many of the children are intelligent enough to be made intensely miserable and ashamed by the continual repetition of their nightly accidents, and the reproachful looks of their parents, coupled with alternate scoldings and pleadings for greater efforts to be dry at night, makes the menace of a wet bed loom large in the child's mind, and undermines his self-confidence in his power to recover. Occasionally the child may attempt to conceal his feelings by a show of bravado to the whole affair, but such an attitude is often the fault of those in charge of him. Punishment is, as a rule, worse then useless, for it increases the child's anxiety instead of helping him to regain confidence in his ability to keep his bed dry. Equally harmful are perpetual lamentations over the child's shortcomings in his presence. The attitude in the home should be one of reassurance, with confidence in the child's ultimate success. It is better to make much of a dry night, and leave unremarked a failure. So long as a child is made to feel ashamed and inferior to his fellows, which, incidentally, may easily happen at a boarding-school, his misfortunes will continue.

Bed-wetting is also common among mentally backward children, and is then rather a different proposition. The early training of these children in the habits of cleanliness is, indeed, an arduous task. Some of them seem to feel no discomfort from a wet bed, while others seem too lazy to bother about it, and it often becomes necessary to offer some sort of bribe in order to train them to be dry at night.

Drugs.—The most popular remedy is belladonna, but no drug is likely to help unless the general management outlined above is adhered to. Belladonna is certainly sometimes very effective, but to be so it needs to be given in large doses. Fortunately, children can generally tolerate relatively much larger doses of this drug than adults. The initial dose should be 7½ minims of the tincture given thrice daily, and the dose should be increased by 2½ minims every four or five days until as much as 30 or even 60 drops are being taken at each dose. It occasionally happens that a child is sensitive to the drug, and then a noisy delirium may be produced by only a few minims, and the drug will have to be discontinued, but otherwise it is seldom that toxic symptoms appear before the incontinence is overcome. When the bed-wetting diminishes, the dose of belladonna should be maintained for two or three weeks, and then be reduced in the same way as it was increased, the whole course taking three months or more.

Another drug of some value is liquid extract of ergot; it may conveniently be combined with belladonna, beginning with 5 minims and increasing gradually up to 15 or 20 drops. Strychnine (2 or 3 drops of the tincture of nux vomica) is also worth a trial in combination with the previously mentioned drugs. Treatment with thyroid extract has its advocates, indeed one authority[4] has stated that nocturnal enuresis in the vast majority of cases is caused by thyroid inadequacy and is readily curable by the administration of thyroid extract. My own experience of thyroid medication in this condition has been disappointing. It is likely enough that children who lack thyroid from birth will be late in acquiring control of their bladder just as they are late in learning other things, but the enuresis is due to their mental backwardness and is comparable with the enuresis that keeps company with mental defect from other causes. It cannot be said that the majority of enuretic children show other clinical evidence of lack of thyroid such as a degree of obesity, coldness of the extremities, or mental hebetude; in fact, apart from their enuresis, most of these children are normal both mentally and physically.

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EUTHANASIA

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A SURGEON is at times consulted about a patient dying of some painful disease and anxious to know if some operation cannot be performed notwithstanding that it may be very severe and may give just a little respite from the symptoms. There is not really any desire on the part of the patient that his life should be prolonged and, though his one wish is for relief from suffering, he really hopes that he will not recover from the operation. But operations at this stage do not do much to relieve suffering, and, as the risk is very great and the subsequent pain is bound to be considerable, its performance is an abuse of surgery. For it is always possible to relieve pain by the administration of morphine. Though strangely enough some practitioners refuse to give adequate doses owing to the risk. Occasionally one is found who yet may urge an operation, even if the risk is very great and the relief somewhat problematical; he seems to think that this is reasonable; whereas the administration of big doses of morphine and the allied drugs which are certain to relieve the symptoms is wrong. No surgeon should now consent to do it, for there are more pleasant ways of passing out of life than dying after an operation with its added pain and asthenia.

Sometimes a patient is so distressed that he begs for a single dose of morphine sufficiently large to cause death. It is the impression of many that though a patient may ask for this, he does not really mean it, as the following case seems to show. Some years ago I attended a man dying from inoperable cancer of the bladder; he craved for a dose of morphine that would put an end to life. For this he repeatedly asked, yet in a drawer well within his reach was enough morphine to kill many men; he knew it was there, but did not make any attempt to take it. His practitioner was quite definite that he did not really mean what he said, and he felt that if he had gone to him with a syringe containing an overdose of morphine, he would not have consented to its injection. His suffering, however, was relieved when morphine was pushed. Now it is one thing to give a big dose of morphine to relieve a symptom even if there is a risk—this is constantly done in medicine and is quite in accordance with its ethics—but it is another thing to give a dose with the object of causing death; this a practitioner should never do. The word euthanasia refers to two things: (1) the practice of painlessly putting to death those suffering from distressing symptoms as an act of mercy, and (2) the practice of relieving suffering so that the going out from life may take place with as little distress and pain as possible. These are such totally different aspects that each should be considered separately.

The State has never sanctioned the first, and a medical man is not given the right by any diploma he possesses to administer a drug to cause death. It is probable that, even if it were permitted, the majority would refuse to carry it out, since they entered their profession to maintain and to prolong life, not to take it. It has been suggested that a body of men should be selected to act as a jury to investigate each case. This may become necessary for imbecility and other conditions; but this question the State has not yet faced. Until it is prepared to give the lead, it is not a matter of concern to the medical profession. For having once pointed out some condition that exists, so that the State may take action if it wishes, it has done its duty.

It is with the second that this article deals, and it is the only one with which the profession need be concerned. Euthanasia in this respect is a matter of interest to all, for death sometimes comes very slowly and its delay may be tragic to the patient and to those around him. A medical man is permitted to give drugs to relieve pain and suffering, so that life may go on with as little disturbance as possible and death may take place peacefully. The amount that he may give has wisely been left to his discretion. He may give as much as he thinks a particular patient needs, providing the aim is to relieve symptoms. The State has wisely not laid down any law that the dose which he can administer is limited in its amount. He must be guided by what is in the interest of that patient. But however much death may be desired by the patient, in no circumstances is a medical man ever permitted to hasten its approach. Now it must not be assumed that the administration of drugs to relieve suffering necessarily hastens the end. For if the pain persists, it will soon undermine the health; and even if a drug has a depressant action, its harmfulness may be more than counterbalanced by the serious effect of the prolonged and severe pain which it is given to relieve. Up to the present the State has entrusted to the medical profession a tremendous power in regard to this aspect of euthanasia, not so much by establishing laws that enable its members to act, but by not establishing laws that limit their power. If medical men have been so entrusted, they can claim that for centuries this privilege has never been abused.

There is now, however, a tendency for many in the profession to concentrate on the prevention of disease and the maintenance of health and to forget that one of its aims should be the endeavour to make the living of life and the passing out from life as easy as possible for the patient and his friends. If a practitioner omits to do this, he has not kept faith with the patient or the State. Since one of the privileges that a medical qualification gives is the power to prescribe dangerous drugs to any amount that may be considered advisable, so long as the aim is the relief of pain and suffering. There is, indeed, little doubt that a popular referendum taken now on this question would show the wish that whenever possible an innocent man should not suffer. But in my talks with nurses it is brought home again and again that there is still far too much suffering in hopeless cases. For although in recent years the administration of hypnotics has been brought to a fine art, attention has been given largely to relieving the strain and pain of an operation or the pain of childbirth, and but little to the relief of the sufferings of those who will soon have to meet their end. This aspect has been neglected. When a practitioner is trying to come to a conclusion on the advisability of euthanasia as a general measure, it is well to discuss the subject with nurses who have such a large experience of these cases; I have rarely met one who did not agree with what is advocated here. The practitioner should remember that he is able to prescribe and to go away; whereas the nurse and the relatives have to stay all the time, and much goes on when he is not present of which he may remain unaware. The pain that these people have to bear is all the greater towards the end, when the will and the desire to live have gone. So long as the conscience of the doctor is clear and he is acting in accordance with the traditions of his profession, he should not hesitate to give relief.

THE RELIEF OF PAIN

Now that so many drugs are available for this purpose no patient should reach the stage when he desires an operation in the hope that it may lead to death, nor should he be allowed to linger on in agony with his pain unrelieved. If they are properly given, the passing out from life should take place with little pain, and death would in no way be hastened.

Unfortunately, it is still difficult when life is likely to last for years to counteract pain all the time; for if drugs are administered over a prolonged period they may eventually fail to act or may lead to demoralization, which may ultimately be as distressing to the patient and his friends as severe pain. But this is a matter of little concern when the end of life is in sight. When pain becomes too severe for the patient to bear, is leading to demoralization, and renders the end so distressing to him and his relatives, it is the duty of the practitioner to push morphine so as to prevent suffering, unless the patient objects. A case of inoperable cancer will be taken as an example. If a patient is told the truth about his disease he will often put up with pain that he otherwise would grumble about. It is strange that when a patient realizes what he is suffering from he should become more contented; but of the accuracy of this impression in the majority of cases there is no question. On the other hand, morphine does seem to lead to some loss of self-control, and it is well known that, if given too early in the disease, the patient gives more trouble than if it is withheld. But is it really so much worse than the demoralization which follows constant pain? It is seen to a much less extent in those who take opium; for though the continued use of opium over a number of years may undermine the general health, those who have practised in the East tell me that it does not lead to moral degeneration. A friend of mine who suffered from a severe arthritis for years during which he was compelled to take hypnotics said that opium induced a beautiful sleep, relieved the pain, and did not lead to any bad after-effects. Morphine, on the other hand, was much more efficacious in relieving pain, but the following day a headache, loss of appetite and constipation followed. It does seem as if the total alkaloids in opium had some action in the body which it is difficult to account for and which prevents those harmful effects that are seen with morphine.

It has been known for years that opium has a different action from its principal constituent morphine, but the work of Billard on phylaxis may offer the explanation. He has shown that when sparteine sulphate is injected with a lethal dose of snake venom into a guinea pig it does not die. This is due not to the neutralization of the venom as has been assumed, but to the sparteine combining with the lipoid of the nerve cells as a result of which the venom cannot act. It is now destroyed by the cells of the body or is excreted. To this protection of the nervous system he gave the name phylaxis. It applies not only to toxins, but to chemicals. Now the harmful effect of morphine is due to its action upon the nervous system. Opium contains about seventeen other alkaloids. May not its distinctive action be due to one of these combining with the lipoids as was suggested by Billard, as a result of which the morphine cannot now be attached and is destroyed by the tissues or is excreted? This would explain not only the different action of opium to morphine, but why a dose of morphine should be more dangerous than one of opium containing the same amount of morphine.

If opium is given to relieve pain, large doses may be necessary. So the rule is to withhold powerful drugs as long as possible; but as soon as the suffering becomes severe they should be given in doses sufficiently big to produce relief. Morphine should be the last. Aspirin, veramon, or novalgin should first be tried. One or the other of these will often be found to have a sedative effect in the early stages. Then nepenthe, hypnopoid, and opium should be tried in this order; these produce a feeling of ease and relieve the suffering. When the pain becomes very severe much morphine may have to be given; for with the severe pain of a renal colic, it is often surprising how much morphine must be given to produce relief; again, when inoperable cancer gives rise to pain, opium and morphine may be tolerated in extremely large doses. The ordinary pharmacopœial doses are useless. It may be necessary to give thirty or forty grains of morphine in 24 hours. At this time the amount that De Quincey took, namely, twelve thousand drops of laudanum each day, should be kept in mind. It is absurd to say that morphine ceases to act. It will always relieve pain if sufficiently large doses are given. I recently saw a patient with inoperable cancer who had been given 1½ grains every hour for over a month previously, and towards the end this was even increased. Yet he was perfectly rational and talked quite sensibly when seen by me a fortnight before his death. When faced with one of these cases, a doctor should remember that his first duty is to the patient, whose feelings are the one thing that should count. He should first have a talk with him and his relatives. If he is content to put up with the pain, narcotics should be withheld. But when the pain becomes too severe, they should be pushed to any extent the patient may desire, so long as the aim is to give relief.

THE END OF LIFE

It is strange to note the efforts that are at times made to keep back the departing soul. The following case which came to my knowledge a little time ago may serve to bring home the folly of this :—

> A man of great energy had a cerebral hæmorrhage at the age of 73. For seven years he was bedridden and a dotard. He then had another hæmorrhage, but by the administration of oxygen and stimulants night and day was kept alive for a week. It was difficult to see the object of this, because, if he could regain his state of a year before, he was nothing but a burden to himself and to every one else. The tragedy was that he was a fine type of man and had he retained his faculties he would never have consented.

Though a practitioner may do nothing to terminate life, it is an abuse of the practice of medicine to go out of the way to prolong it uselessly. He occupies an impartial position and in coming to a decision he is not influenced by emotion. It is his duty at such a time to realize that it may be the best thing that could happen and, having quietly pointed out to the relatives that no treatment could make life worth living, he should hold his hand. What is the good of making a great effort to overcome an acute disease such as pneumonia, when, even if the patient recovers, the health he can expect is no better than that which he had before when life was hardly bearable. The probability is that it will not be so good. When an operation is discussed, the practitioner has to take into consideration not only the immediate risk, but whether the expectation of life is sufficient to justify the risk and suffering that the operation involves and whether if the patient lives, the health he is likely to obtain is sufficiently good to make life worth living. When these questions are faced, many operations now performed will be found not to be justified.

When an old person is beginning to lose ground, or when a man who has had a long illness is failing, it is equally unfair to prescribe stimulants unless the patient expresses a wish for them. For if life is now maintained, it amounts to little more than the prolongation of the act of dying. It is my impression that it is rare for a man at such a time to wish it to go on. He comes to regard death as others look upon sleep and quietly yearns for it as a happy release. So often, however, the relatives wish it to be maintained; they attribute his weakness to the taking of little food and to his lying in bed; they think that if only he would make an effort he would live. Consequently they endeavour to get him to eat more food and to take exercise. To one who is nauseated by the mere mention of food and who is far too weak to exert himself, this but adds to his suffering. The practitioner should at this time consider the interest of the patient, who may need to be protected from his relatives, though they are trying to do everything for his good; he should point out to them that the weakness is the result of age or disease. In this state the patient is better for rest and for taking little food; attention might be drawn to the book "Diet in relation to age and activity," by Sir Henry Thompson. The practitioner will ease the feelings of the relatives by pointing out to them that, if it is just a relapse as they may be hoping, rest and little food will help him to recover; if it is just the terminal break up, his suffering will not be added to nor will his end be hastened. Stimulants should be withheld. In a terminal illness or in advanced age a feeling of weakness is often present which is very trying to the patient. Tonics seem to be indicated. They are of little use since the body is not able to respond. At such a time sedatives are indicated; tincture of opium in two minim doses t.d.s., or sodium barbitone gr. ii, t.d.s., will often give much relief.

In a terminal illness a hypnotic is often withheld too long or given in insufficient doses. The drowsiness and weakness that are seen the following day are attributed to it and the amount is then reduced, whereas really these symptoms are part of the illness, and at this stage no habit will be formed. Nor should too much attention be given to the fact that those who observe him say he closes his eyes and is not restless. So often the patient means by sleeplessness the disturbances caused by dreams which at times fall just short of delirium and are even more dreaded since they are remembered. It is kinder at this time to increase rather than decrease the dose.

ACUTE DISEASES

In acute diseases the patient is encouraged to take as much light food as possible and to drink plenty of fluids, the aim being to maintain the strength and to overcome the toxæmia. He can easily become nauseated by excess of these and this adds to his misery. At this stage all the tissues are suffering from the effect of the toxæmia and are functioning badly. This applies to the stomach and the kidneys and harm may even result from too much food and too much fluid. Except in children, in whom growth has to be allowed for, it is the practice of many nowadays to cut these down. It is found that when the expectant treatment is carried out in acute appendicitis and acute cholecystitis the patient does extremely well, when no food is given for a week or ten days. If his mind is put at rest by explaining to him that the starvation is in his own interest and that it will do him good rather than harm, it is extraordinary what little wasting takes place. In acute diseases treated by the usual measures which have failed it is my practice when the condition seems hopeless to withhold stimulants and to abstain from forcing food or fluids. Since a patient should never be allowed to pass out from life with his mental faculties too alert, I give sufficient opium or morphine to quieten consciousness. It is somewhat surprising to find that sometimes such a patient proceeds to improve and lives. Is it not possible that the previous treatment by stimulants, food and fluids, has been doing harm rather than good? Is it not possible that the constant effort to keep him in a certain position and the daily washing are really fatiguing to one who is ill? Is it not possible that the opium by quietening consciousness prevents the entrance of those sensations that have previously been causing him distress? As a result of abandoning treatment he obtains the rest of which he is sorely in need. Since coming round to this view it is my practice when a certain stage has been reached in an acute illness and the patient is going down hill in spite of careful nursing, not to force food or fluid; to withhold stimulants and to give sedatives. It seems that the results are better than those that were formerly obtained. In addition, the patient has an easier passage, for he is less disturbed. This aspect of euthanasia is sometimes lost sight of.

THE VALUE OF AUSCULTATION OF THE ACUTE ABDOMEN

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THE stethoscope has proved of indispensable value in the diagnosis of affections of the chest, but in the elucidation of abdominal diseases its use has been much neglected. Auscultation of a large number of abdomens—normal and abnormal—has convinced me that valuable data can be obtained, more especially in the diagnosis of certain acute abdominal conditions.

THE NORMAL SOUNDS

The stomach, when it contains food, produces a medley of gushing and gurgling sounds audible over the greater part of the abdomen, but most intense in the epigastrium. They are not prominent when the stomach is empty. The large intestine at the height of activity produces various sounds, most marked over the ascending and transverse colon. The majority of intestinal sounds, however, are due to the peristaltic activity of the small intestine, and for clinical purposes they are the most important. These sounds are most active an hour or two after a meal and vary from soft crepitations to loud harsh gurgles. Their number and different characters are at first confusing, but this confusion is less when the stomach is empty and intestinal activity is minimal. They are best appreciated over the lower left quadrant of the abdomen, where the sounds produced by the cæcum and ascending colon are least obtrusive. A little experience will indicate that the sounds produced by the small intestine possess a certain amount of rhythm, rising and falling in intensity, and interspersed now and again by explosive crackles and rumbling gurgles, sometimes audible at a distance. It is advisable to listen for a few moments and to repeat the process, for the frequency and intensity of the sounds vary from time to time, often subsiding into silence for a short period to reappear in abundance. In the evaluation of any departure from the normal concentration on the sounds produced by the small intestine yields most useful data, and for this purpose auscultation over the left or right lower abdominal quadrants suffices.

ABNORMAL SOUNDS

The routine employment of the stethoscope in all acute abdominal conditions has indicated that auscultation is of assistance in the following conditions: (1) *General peritonitis* reduces the abdomen to silence. As long as the inflammatory condition is confined to a particular organ, no alteration in the sounds can be distinguished. Occasionally a friction rub, analogous to that of pleurisy or pericarditis, may be heard if the peritoneal surfaces are roughened by lymph, for example, in cholecystitis or tuberculous peritonitis. The rarity of this sign, however, detracts from its practical value and even when present it is much more readily detected by palpation. The peristaltic sounds are still audible even in the presence of a localized abscess, for example, in an appendicular abscess, although they may be somewhat diminished in intensity and frequency. They are abolished only when the peritonitis becomes diffuse, and the silence in this condition is therefore of grave significance.

(2) In *perforations* of the intestinal tract into the general peritoneal cavity there is often complete silence even before peritonitis is established. This silence may be found in perforations of the vermiform appendix, of diverticula of the colon, or of peptic ulcers. In the

last of these the sign was frequently found as early as half an hour after the onset of perforation. A silent abdomen therefore is valuable confirmatory evidence of suspected perforation. It has also occasionally proved of value in the differentiation of these lesions from acute thoracic affections, for in the latter the abdomen is never silent. In perforations of the intestinal tract the peristaltic silence is frequently replaced by transmitted heart sounds which may be heard as loudly over the abdomen as over the chest. This conduction of cardiac sounds was described long ago by Claybrook[1] in association with abdominal injuries causing rupture of the intestine. He stated that the presence of this sign after an abdominal injury was an indication for immediate laparotomy whether other signs were present or not, and also that this sign was present in other perforations and would be of value in differentiating rupture of a gastric or duodenal ulcer from appendicitis, as it would appear at once in these cases, but not in appendicitis until rupture had occurred. From personal experience the sign has been of great value in obscure cases of perforation of gastric or duodenal ulcer. It is produced by the presence of free gas and fluid in the peritoneal cavity. Free fluid alone, e.g. ascites, does not produce the sign and in several cases of ruptured ectopic gestation it was not elicited even when there was a large amount of free blood in the peritoneal cavity. Free gas therefore seems to be essential for its elucidation. In this connection it is important not to confuse the sign with the heart sounds sometimes transmitted by distended hollow organs like the stomach and to exclude those sounds associated with obstetric conditions. Claybrook's sign is valuable when taken in conjunction with the absence of peristaltic sounds. This combination usually indicates a perforation somewhere in the intestinal tract.

(3) *Intestinal obstruction* increases the number, the

frequency and the intensity of the peristaltic sounds. Loud rumbling noises as if of distant thunder may be heard, and these are common to all obstructions but become more prominent the lower the site of occlusion. The stethoscope detects a characteristic metallic or tinkling resonance produced by the mixture of fluid and gas in the small gut, frequently echoing as if in hollow caverns. In addition there may be long drawn out gurgles and sizzling noises as if gas were passing through narrow channels, most intense at the height of a peristaltic wave. Another sign frequently present, especially in obstructions of the small intestine, is a splashing sound which can be elicited by quickly dipping the fingers on the abdomen as if for deep palpation. It is produced by the succussion of air and fluid in the obstructed coils. Once heard these sounds are very characteristic, and they will aid in confirming other physical signs. They are of greatest value in the early stages of obstruction in the small intestine, and can often be elicited before other signs, such as distension, are present. When the abdomen is distended auscultation will serve to differentiate mechanical obstruction from that due to peritonitis or paralytic ileus.

(4) In *paralytic ileus* the abdomen is usually silent. This complication is not uncommon after abdominal operations, and difficulty may arise in the diagnosis from post-operative peritonitis or from obstruction of mechanical origin. It has already been shown that the latter gives rise to an augmentation in the sounds and an alteration in their character, and these together with the presence of succussion will aid in the diagnosis. It is often difficult to diagnose paralytic ileus from post-operative peritonitis, but the latter can often be suspected from the very nature of the operation, and when it can be excluded, a silent abdomen points to paralytic ileus. Its early detection ,is possible by

means of the stethoscope, thus allowing the institution of suitable remedies when they can be of most value. The return of peristaltic sounds is a good prognostic sign.

CONCLUSIONS

It is possible by auscultation in acute abdominal conditions to differentiate between the hyperactivity of mechanical obstruction and the inactivity caused by paralytic ileus or general peritonitis. The increase in the sounds in intestinal obstruction is in marked contrast to the silence of general peritonitis. When the peristaltic silence is replaced by the transmission of heart sounds it is indicative of a perforation of the intestinal tract. In post-operative conditions auscultation aids in the differentiation between mechanical obstruction and paralytic ileus. It can be concluded therefore that the stethoscope is a valuable aid in the diagnosis of certain acute abdominal conditions. It should be stressed, however, that as in all other methods of diagnosis, the value of auscultation is enhanced when the findings are appraised in their relation to other clinical evidence.

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A PLEA FOR THE NEUROTIC

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Joint Medical Superintendent, Middleton Hall Mental Hospital, and Almora Hall, Middleton St. George, Co. Durham.

As one who became interested in the neuroses and those suffering therefrom (more than thirty years ago) and who for nearly that period has given most of his time to their study and treatment, I may perhaps be permitted to plead with the general practitioner and others for a better understanding of and more interest in the " neurotic." The neurotic is no doubt the *bête noir* of the general practitioner, and apt to be regarded by him as a nuisance rather than as the very sick man or woman he or she really is. It is common knowledge to those constantly in contact with neurotics, that the mental pain and distress from which so many of them suffer acutely are not a little contributed to by their realization that their doctor, if not regarding them as a nuisance, at least appears to be unable to do anything for their relief. Incidentally, I wonder if our tendency to impatience with the neurotic and his ailments may not be due, at least in some measure, to a feeling of helplessness as regards our efforts at treatment.

More than thirty years ago, when a house surgeon at my medical school, I remember a man presenting himself as an out-patient, and when his turn came for examination he handed my chief two or three pages of foolscap on which he had written his story. He asked my chief to read these as he did not feel able to state his case in public. My chief glanced at the screed and told the man he had come to the wrong department, this was the surgical department, and passed on to the next case with the remark to the class of students, " One of those neurotics for whom we have no time—the man's mad." On reading those sheets of foolscap later I found in these the kind of story which I have heard many times since, showing all the symptoms of a severe neurosis. Here was a very sick man for whom I could do nothing other than give him the utterly futile advice not to worry, which is about as useful as to advise a shy young man to adopt an easy manner, especially among ladies. What became of him I do not know, but in all probability he cut his throat or drowned himself for want of the help we should have been able to give him.

Some time ago—more than thirty years later—a patient came under my care on the advice of a consultant given more than a month previously in his report on the case to the family doctor. The patient had been ill for months, but only with great reluctance had the doctor made an appointment for him to see the consultant because there was no apparent cause for the patient's symptoms and mental depression and only the need, as he thought, for an effort on the patient's part to "pull himself together." Moreover, for similar reasons, he did not agree with the advice of the consultant that the patient needed specialized treatment in a specialized nursing home and took no steps in the matter till once more urged to do so. Incidentally, this patient had been ailing for more than a year, had lost over a stone in weight, and had ultimately to give up responsible work which he had carried on successfully for eighteen years. The medical man concerned holds a well-deserved reputation as a very able practitioner, but like a number of other able medical men is apparently unable to appreciate that a patient may be a very sick man and yet show no physical signs of the symptoms from which he claims to be suffering. No attempt seems to have been made in this case, and many similar ones, to discover any psychogenic cause for the patient's mental and physical symptoms which were, however, present and more than sufficient to account for them. There is no reason why under proper treatment this patient should not be fit to return to work in a few weeks, but such was his mental distress when I first saw him that had he remained much longer untreated it might well have proved more than he was able to bear and another preventable tragedy been added to the list of those broadcasted as "missing from his home. . . . He has been much depressed of late and it is feared that some mischief may have befallen him."

During the thirty years which have intervened between the first and second instances just mentioned, how many thousands of unfortunate people have suffered from similar mental disturbances called in common parlance "nervous breakdown" or just "nerves" with and without various physical manifestations for which repeated physical examinations disclose no apparent cause and yet who have after what seems to them a hopeless and endless struggle finally ended it *via* the gas-oven, railway lines or the river? Though, of course, it is obvious that the busy general practitioner has not the time, even if he had the training, to deal with such patients as they should be dealt with, it is not so easy to understand why he should not treat such patients as he treats others who need special treatment which he is unable to give them, surgical or medical, send them where it is obtainable before it is too late for any treatment to be successful, and not continue to regard such patients as mere weaklings who imagine they are ill when they are not, and for whom nothing can really be done. It was more than amply demonstrated during the war that it was by no means only the weaklings who suffered from neuroses. Among our patients in those days were men who had gained many distinctions for courage and endurance. Many of the psychogenic causes are as operable now in civil life and just as capable of producing neurotic illnesses in once strong and healthy men and women.

I have a patient at the moment who has reached the age of 49 and who served with distinction in the war for three years; he has since been a schoolmaster, with charge of physical training and games, and himself an athlete. Till three months ago he had not known, except when wounded, what it was to be " sick or sorry." He then became depressed, lost interest in his work and all confidence in himself, talked of failure, gave up all social engagements and contemplated suicide. There were several psychogenic causes for this breakdown, some of which had been dormant (successfully repressed) for many years. He is making a satisfactory recovery.

However, supposing the general practitioner did realize, as he should, that the neurotic is a sick man at least as much deserving of the best and most up-to-date treatment as any other of his patients, how is he to procure such treatment for his patients? If he has a patient with appendicitis or pulmonary tuberculosis he has no difficulty about his or her disposal. With regard to the patient suffering from functional nervous disorder or the milder mental illnesses, however, the matter is more difficult. In respect of such patients who can afford to go there, there are a small number of specialized nursing homes scattered about the country where they can obtain really efficient treatment at fees varying from six to fifteen guineas a week. There are also private mental homes where such persons can be admitted as voluntary patients at lower rates and where arrangements have been made whereby such patients do not come in contact with the various forms of more severe mental illness. If, however, the general practitioner sent his better-class neurotics to these institutions in anything like the numbers he has for disposal, the demand for accommodation would greatly exceed that available, though no doubt the demand would soon create more accommodation.

His real problem, however, is how to dispose of his panel and pauper patients. Such disposal has been made possible under the Mental Treatment Act of 1930. Under this Act power is given to local authorities to provide clinics to which such patients can be sent for advice and treatment; when such a patient is unsuitable for out-patient treatment the same Act has made it possible for him to be admitted on his own request as a voluntary patient to county and borough mental hospitals. A number of such clinics have been set up throughout the country and are doing good work. Where they do not exist I suggest that it is up to the panel doctor and general practitioner generally, in the interest of these patients, to point out the need for them to the local authorities. Some mental hospitals, notably such borough hospitals as Derby and Swansea, and county hospitals such as the North Riding of Yorkshire, are making a special effort to accommodate and treat this type of patient. On the other hand, far too many of these hospitals are at present doing nothing to meet the provisions of this Act. This will only be corrected when the public, through their doctors, urge that accommodation be provided. When the neurotic patient learns that such suitable accommodation is at his disposal and when his doctor urges him to avail himself of it, he will learn to do so, no less readily than he has learned to avail himself of sanatorium treatment for himself and welfare centre treatment for his children.

MEDICO-LEGAL PROBLEMS IN GENERAL PRACTICE*

IV.—DEATH IN ITS MEDICO-LEGAL RELATIONS

By SYDNEY SMITH, M.D., F.R.C.P E.

Regius Professor of Forensic Medicine, University of Edinburgh.

DEATH is one of the few inevitable things in life and has no doubt a considerable interest from a biological point of view. When, however, death occurs suddenly or unexpectedly, it introduces an entirely new set of responsibilities with which the medical practitioner is intimately connected. Such deaths are by no means uncommon and in the year 1931 there were no less than 65,000 deaths which were reported to the coroners in England and Wales. Out of this total there were 27,000 in which no inquest was held, and this gives a fair idea of those cases where sudden death had occurred in circumstances which left no doubt that it was due to natural causes. With such a very large number of sudden deaths it is certain that every medical practitioner must, from time to time, have to decide what to do in cases of sudden death. It is of course possible that many cases of sudden death occur in patients with some disease which is quite well known to the medical attendant; when death occurs suddenly in such a case, the medical practitioner will usually issue a certificate of death. Many other cases, however, may occur in which the doctor either does not feel certain of the cause of death or, even when he knows the cause, is not quite sure that everything is in order.

Section XX of the Births and Deaths Registration

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* This is the fourth of a series of articles on medico-legal subjects to which other authorities will contribute in succeeding numbers of *The Practitioner.*

Act, 1874, provides that in the case of the death of any person who has been attended during his last illness by a registered medical practitioner, that practitioner shall sign and issue a certificate stating, to the best of his knowledge and belief, the cause of death. This certificate must be delivered forthwith by the registered medical practitioner to the Registrar of the district and at the same time he must give to some person required by the Act to give information concerning the death, a notice in writing of the signing of the certificate.

Some practitioners are under the impression that if the death is one concerning which an inquest may have to be held, they should not give a certificate but should report the case to the coroner instead. This is not the correct procedure. The practitioner in such circumstances must issue a certificate of death if he is able to certify the cause to the best of his knowledge and belief. If, of course, he is in such doubt as to the cause of death that he cannot certify, then he must not give a certificate. Apart from this, whatever the cause of death, he must give a certificate in the required form and if he has any reason to believe that an inquest is necessary or that there are any suspicious circumstances connected with the death, it is his common-law duty to inform the coroner or the police. On the back of the certificate of death there is a space for a statement that the death has been referred to the coroner, which must be filled in in such circumstances. Delivery of the certificate to the Registrar means normally posting the certificate, but in certain circumstances delivery may be effected by sending the certificate by messenger. A practitioner has no right to withhold a certificate because his fee for attendance has not been paid or for any other cause, and no fee is payable for the issue of a death certificate.

Sudden deaths may be due to natural causes or to misadventure, accident, suicide or murder, and in many circumstances there may be great difficulty in deciding whether sudden or unexpected death is the result of disease alone, violence alone, or violence plus disease. In no circumstances should a certificate be given unless the practitioner feels quite confident about the cause of death. He should not issue a certificate when he has not been in attendance on a case, but has been called in at the last moment; great care is necessary in this connection, for it is not uncommon when a person is dying from poison or other form of violence for the guilty party to call in a doctor towards the end in order to obtain a death certificate. The practitioner should never give a certificate without seeing and examining the dead body, even when he has been in attendance and knows that death is likely to occur in the near future. There have been many cases in which frauds have been perpetrated on insurance companies by means of death certificates fraudulently obtained from practitioners who have not exercised this simple precaution. There is not any law requiring a practitioner to examine the body before giving a certificate, but on the statutory certificate the practitioner is required to state when he last saw the deceased alive and if the body was seen by him after death. If the certificate shows that the deceased was not seen by the practitioner within fourteen days before death, or if the body was not seen after death, the Registrar has instructions to report the case to the coroner.

Certain types of cases give little trouble to the medical practitioner and he knows that these must be reported to the coroner; such, for example, as death associated with accident or injury, to exposure and want, or death from neglect by others. He would be well advised to notify all cases of death from industrial disease. Other cases give rise to a certain amount of trouble; for example when a person dies who has been in the habit of taking alcohol, is it the duty of a medical practitioner to certify the cause of death as alcoholism? The same problem arises when a patient has been in the habit of taking a narcotic drug such as veronal; if death occurs it may possibly be due to the action of alcohol or drugs as the case may be, or it may be due to some intercurrent disease. The manner of certification of such cases must be decided by the doctor himself, and though the family may not like it, it is in all probability better to have the true cause of death placed on the certificate. If the practitioner really believes that the alcohol or drug, as the case may be, although it had been taken, was not the cause of death, then by all means let him say nothing about it.

In cases of industrial disease there is often a considerable doubt whether or not the disease was due to the nature of the work. In all these cases it is better to have the case reported to the coroner and let him take responsibility. When the practitioner has some reason to suspect that all is not well, he should never take the responsibility himself of suppressing an inquiry. He should of course make himself reasonably sure that an attempt has been made, for example, to poison his patient, by analysis of the urine, or vomit, or blood, as the case may be, and if he is convinced that some attempt has been made on the life of his patient, he should consult or report to the coroner or police forthwith. In cases passing to the doctor suffering from the effects of abortion or incomplete abortion, if he is reasonably certain that there has been criminal interference, the case should be reported to the coroner. It is quite wrong for the medical practitioner to take the responsibility himself in these cases.

In Scotland the conditions are quite different from those pertaining to England. In Scotland there are no coroners' inquests and all cases of sudden, violent or unexpected deaths are investigated by the Procurator Fiscal, who is a judicial officer attached to the

Department of the Lord Advocate. This official makes a private inquiry, orders such post-mortem or other examination as he thinks fit, examines witnesses and decides whether the case is one requiring further action or not. If not, the body is disposed of in the ordinary way without any publicity whatsoever. The medical practitioner who has any doubt about a case is able to consult the Fiscal and he will be advised by him as to the best mode of action. The absence of publicity under Scottish law is a highly desirable factor in the investigation of sudden deaths.

No medical practitioner should make any post-mortem examination of a body in a case that is being reported to the coroner or Fiscal or if there is any suspicion about the cause of death. There is no statutory prohibition but it is highly desirable that the body should be left entirely at the disposal of the investigating authorities in such cases.

Any practitioner may be asked by a coroner to make an examination of a body in order to ascertain the cause of death. In the larger towns such examinations are ordinarily carried out by a pathologist, but in the country districts and in the smaller towns this duty of assisting the authorities may devolve upon any practitioner. This duty is profoundly important, for the conditions found on examination may lead to the loss of reputation, the liberty, or even of the life of a fellow human being. On the other hand it may result in liberating a person from suspicion, or when improperly performed may be the unfortunate means of allowing a criminal to go free.

Death frequently occurs from natural causes in circumstances which may lead to the assumption of foul play. This is especially liable to occur when the deceased was known to have been quarrelling with some person shortly before death, or when his body has been found in a lonely place, or in suspicious circumstances, or when the symptoms just prior to death suggest the effects of poison or other violence. The medical examination in such cases assumes a considerable importance, for one or more persons may be suspected or even arrested in connection with the death. And it is the medical report which is the decisive factor with reference to future proceedings.

It is quite possible that a person may be leading an apparently normal healthy life while suffering from a disease, the existence of which is quite unknown to him. Death may be caused entirely by the agency of such disease or it may be accelerated by fright, anger or other emotion, or by slight degrees of violence, or from the particular work in which he was engaged at the time of death. As a general rule no information can be obtained from an external examination of the body and a very careful autopsy is necessary.

In carrying out this examination the practitioner must be able to distinguish between conditions produced as a result of post-mortem changes, the effects of disease and the effects of violence, and if there should have been violence as well as disease, it is necessary for him to come to some decision as to whether death was directly the result of the violence or of the disease or to an acceleration of death by violence.

For example, I remember a case in which a person died and was buried on a medical certificate of meningitis. Some months afterwards it was reported to the police that the person had been assaulted shortly before death and that he had died as a result of injury to the head. The body was exhumed and a fracture of the skull was found in the left parietal region. It showed no signs of sepsis, but on the same side of the skull there was evidence of chronic suppuration of the middle ear and a small erosion was observed opening into the interior of the skull. In this case the cause of death was obviously the disease of the middle ear leading to septic infection of the membranes of the brain, but on the other hand the infliction of violence sufficient to cause a fracture of the skull in a case of this sort must be held to have contributed to the fatal issue.

In general, the law considers that a man is responsible for all the effects of his act and if a person suffering from some disease is killed by violence which in any ordinary person would not cause death, the responsibility of the assailant is not necessarily lightened. It is essential, however, when violence has been used and when some disease has been ascertained to be present, for the doctor to assess, so far as he can, the part played by each in the causation of death. Similarly, in cases in which workmen die while engaged in their employment, it is essential, for the purpose of assessment of compensation, to give some indication whether the work at which they were employed was the sole cause or whether it was a contributory factor in causing the death.

Before discussing the many conditions which may lead to sudden or unexpected death it may be well to indicate the necessity of remembering certain post-mortem changes which may be confused with the effects of violence or disease. One of the most important post-mortem changes is post-mortem staining or hypostasis. Immediately after death, when the blood sinks to the more dependent parts of the body and organs, patches of reddish or blue colour appear, and in certain cases such patches of staining may very closely resemble bruises. If there is a tight band around the neck such as a collar or tie an appearance may be presented which strongly suggests strangulation. At the back of the larynx these discolorations are commonly found, and as they closely resemble bruises they may lead to the assumption that the person has been throttled. Similarly, wrinkles in the shirt or underclothes may produce lines of alternating paleness and discoloration, the appearance of which suggests that the person had been severely beaten. In the internal organs the erroneous impression of inflammation or congestion may be given. The distinction is fairly easy in fresh bodies, for in a bruise the blood has extravasated, has been forced into the tissues and has firmly clotted, whereas in patches of hypostasis the blood is within the vessels. Unless extravasated blood of this nature can be seen the diagnosis of a bruise should never be made, and it is desirable to have microscopic sections made in case of doubt.

Conditions connected with the circulatory and respiratory system are the most common causes of sudden death. Fatty degeneration or infiltration of the heart is one of the commonest and, as this condition is practically never diagnosed during life, and as death usually occurs after slight exertion or violence, it is extremely important that the doctor should recognize it after death. It is quite possible for a heart to have undergone a considerable degree of fatty degeneration without showing much naked-eye change and it is always advisable before coming to any conclusion on the matter to have a microscopic examination made.

Disease of the coronary vessels in the later periods of life is comparatively common and frequently leads to sudden death. It may be associated with attacks of angina pectoris, and in such cases the medical adviser is usually aware of the condition and is able to certify the cause of death. In many instances, however, death occurs in the first attack, and though attacks of angina are usually associated with sudden effort, it is quite possible for attacks to occur at night or when the patient is at rest. The question of delayed onset of angina after sudden exertion may be of considerable medico-legal interest and it is well known that pain may not supervene until a considerable time after the exertion has ceased. When the thickening of the coronary vessels is gradual, anginal attacks may result from time to time; when, however, there is a sudden occlusion of one of the branches infarction results, and may be associated with very severe cardiac symptoms. Death may occur at once or there may be cardiac collapse with progressive weakness which may lead to death after days or weeks. On examination of these cases an area of infarction is commonly found in the wall of the left ventricle. If one of the larger branches of the coronary artery is suddenly occluded, death usually occurs with dramatic suddenness. In the post-mortem examination both coronary arteries should be opened up with probe-pointed scissors from their origin in the aorta and continued to their termination.

Rupture of the heart as a cause of sudden death is not common and is usually associated with diseased arteries and a damaged condition of the heart muscle. Rupture from violence if it occurs immediately offers no problem to be solved, but occasionally a blow on the chest may cause damage to the heart which in turn may lead to rupture of its wall, or death from heart failure, weeks or months after the injury. Recognition of this fact is of great importance in cases under the Workmen's Compensation Act as well as in criminal cases.

Mitral or tricuspid incompetence or stenosis rarely leads to sudden death and though death may occur suddenly in disease of the aortic valve the condition is usually known to the patient and his doctor. Occasionally extraordinary conditions occur.

I recollect a dramatic case in which a person who was rioting in the street fell down dead. He was taken to hospital and examined, but no sign of any injury was observed, and death was certified to be due to heart failure. A post-mortem examination was ordered and the medical officer found a bullet embedded in the heart, but a careful search of the whole exterior failed to find any wound or track of the bullet. On re-examining the case, however, it was found that the bullet had passed through the mouth, probably having been fired downward from a first storey window, passed through the mouth and through the mediastinum to the heart.

In another case reported some years ago a healthy woman was taken suddenly ill while walking in the street and was removed to hospital, where she died six hours afterwards. At the autopsy a large sewing needle was found in the heart, into which it had worked and caused a fatal hæmorrhage.

Pericarditis is usually associated with well-marked symptoms, but occasionally the condition is entirely latent and no symptom occurs until the person is on the verge of death. I have personally examined four cases in which there was well-marked pericarditis without any symptoms whatsoever, and a large number of other cases have been published from time to time.

Occasionally death occurs, without any previous symptoms, from rupture of the aorta. The rupture usually occurs just above the aortic valves and may lead to a dissecting aneurysm or to rapid death. These cases are by no means infrequent and the absence of any signs of a pathological condition and the clean cut appearance of the rupture of the intima may arouse suspicion that violence has been applied to the chest wall. The practitioner would do well to remember that many of these cases occur from causes which are at the present moment inexplicable; the condition is never diagnosed until the autopsy is made.

There are many conditions of the respiratory system which lead to sudden death, the commonest of which is œdema, or œdema associated with spasm. Œdema of the glottis may occur after minor injuries, bee or wasp stings, inflammatory conditions, or may arise apparently without any known cause. Death takes place with all the appearance of asphyxia and may lead to a strong suspicion of violence. Œdema of the lung occasionally causes death with equal suddenness. Occasionally there may be a combination of œdema and choking, or œdema and spasm, especially if a small foreign body becomes impacted in the throat. Slight violence applied to the larynx may lead to immediate collapse and death. These cases are generally considered to be due to inhibition of the respiratory and cardiac centres and usually no cause of death can be found in the most careful autopsy.

I once saw a death of this nature which occurred in a young man who had a small wart in the larynx which was about to be excised under local anæsthesia. The surgeon caught the wart in his forceps and the moment slight traction was put upon it breathing stopped and though every effort was made to resuscitate him the youth expired. On post-mortem examination nothing was found to account for the death; it was apparently due to pure inhibition.

In other instances death is known to have occurred after slight degrees of violence applied to the throat, or due to the passage of a sound into the urethra, or during manipulation of the uterus. Death may occur suddenly from such diseases as pneumonia and broncho-pneumonia without any of the symptoms which we are accustomed to see. I have seen more than one case in which both lungs have been consolidated in persons who have dropped dead while walking in the street. Most practitioners who are accustomed regularly to see cases of pneumonia with their pronounced and urgent symptoms will hardly credit the fact that complete consolidation might occur in the circumstances which I have given.

Disease of the brain may produce unexpected death but, as a general rule, the death is not particularly sudden. The commonest cause of death is hæmorrhage into the substance of the brain or on to its surface, and it is well to remember that diffuse hæmorrhage on the surface may go on for days after a slight injury and then produce death with dramatic suddenness. Hæmorrhage into, or pressure upon, the pons may lead to symptoms which strongly suggest narcotic poisoning.

For example, I had a case in which a person was sitting at a café when he suddenly became unconscious. He was taken to hospital, where he was found to have all the symptoms of opium poisoning, including pin-point pupils, and shortly afterwards he died in a state of coma. A diagnosis of opium poisoning was made and an individual had been arrested for the crime when the post-mortem examination showed an aneurysm of the basilar artery which had been present for a considerable period without causing any symptoms whatsoever.

An abscess or tumour of the brain may remain latent for months without causing symptoms and then suddenly lead to coma and death.

In one instance an elderly man who was crossing the street was knocked down by a motor car and became unconscious, or fell unconscious in front of the car. He died and on dissection was found to have an extensive syphilitic gumma in the cerebral cortex. An interesting problem arose as to whether the driver of the motor car was responsible for the death of the individual or whether the gumma had caused the man to fall at the precise moment when the motor car touched him. There were no marks of violence on his person; and if the car struck him it certainly caused no observable damage.

The extension of chronic middle ear disease may lead to the formation of an abscess of the brain or meningitis which in turn may cause sudden death, and unless the practitioner remembers the possibility, the presence of an infectious condition of the antrum or nasal sinuses may be overlooked completely. In all these head conditions a person may be found partially comatose in the street and as in falling he may have injured his head, there is always a difficulty in deciding whether he had a lesion of the brain which caused him to fall or whether he received a blow or other violence which caused the hæmorrhage. When a person at work dies and one of these conditions is found, it is very important to have a very careful examination so that some opinion may be given as to the cause of death.

A great many other examples might be given of death occurring in individuals who have shown no symptoms whatsoever. Many conditions associated with the intestinal canal produce death with symptoms suggestive of acute poisoning. Such things as rupture of an ulcer, acute pancreatitis, hæmorrhage into the suprarenal glands or pancreas, twisting or intussusception of the bowel, the occurrence of ileus or paralysis of the intestine, and similar conditions. Most of these, however, are readily diagnosed on post-mortem examination, but unless such examination is carried out there is no possibility of arriving at the true cause of death. Too often cases of arsenic and antimony poisoning have been disposed of by lax medical certification. In all such cases it is most important that the medical examination should not only indicate the true cause of death, but also clearly establish the relationship between the injury or accident, and subsequent disease or death. Such relationship, if any, must be proved by definite evidence and must not be arrived at by surmise or conjecture.

CORRESPONDENCE

This journal has never devoted any of its pages to correspondence or "letters to the editor," but the necessity for such a feature has often been felt, especially for the publication of comments from readers. Letters are therefore invited, particularly if they contain practical points arising out of articles in The Practitioner.

ADDISON'S DISEASE

SIR,

The Therapeutic Trials Committee of the Medical Research Council are arranging an inquiry into the value of extracts of suprarenal cortex in the treatment of Addison's disease. The work will be done on the Committee's behalf by Professor T. R. Elliott (University College Hospital, London), Dr. Robert Hutchison and Dr. S. Levy Simpson (London Hospital), Dr. J. F. Wilkinson (Royal Infirmary, Manchester), and Professor D. Murray Lyon (Royal Infirmary, Edinburgh). As it is desired to admit to these hospitals sufficient patients for the inquiry as soon as possible, the Committee would be very grateful if consultants and practitioners having suitable cases of Addison's disease under their care would be good enough to communicate with one or other of the physicians named above.

F. H. K. GREEN,
Secretary, Therapeutics Trials Committee,
Medical Research Council.

23rd February, 1934.

BLOOD EXAMINATION IN GENERAL PRACTICE

SIR,

The busy general practitioner has seldom the time and equipment for including the examination of the blood picture in his routine investigation. But certainly it would be as helpful as examination of urine, provided it were quite as easy. I use the following method of staining which yields more hæmatological data than the more difficult methods of Giemsa or Jenner. Moreover it takes about a minute to prepare a slide and another four or five minutes to examine under the microscope.

I take an ordinary glass slide and heat it over the Bunsen flame. With a glass rod I spread a drop of the stain 0.3 per cent. cresil blue in alcohol. Then I puncture the finger and take a drop of blood on a cover slip and press it on the stained side of the slide, put a drop of oil on the cover slip and see it under the microscope. Professor Davidson has described this method for staining reticulocytes, but it is perhaps the best and simplest method of staining platelets. I count platelets and red cells in several fields and calculate the proportion of the platelets to the red blood corpuscles. Knowing the number of the latter per c.mm., the number of platelets can be deduced. The red cells can be seen in this method in their natural state and there is no risk of distortion. The lymphocytes can be differentiated from the granular cells, though I am afraid it would not be possible to differentiate the monocytes. The leukæmic cells look very characteristic in this method. A patient came to my surgery this evening complaining of weakness and breathlessness. I found nothing to account for this in my general examination except pallor. On examining a blood slide by this method in a few minutes time I found that I was dealing with a case of leukæmia. Now I can do a detailed examination. Similarly I have discovered pernicious anæmia when I have least suspected the condition.

1st March, 1934. M. GHOSH, M.B.

CLINICAL RESULTS OF CONTRACEPTION

SIR,

Of recent years much has been written concerning contraception, but we are still in need of information with regard to clinical results. Considerable data have been accumulated concerning the use of mechanical methods such as the Dutch cap, and it is probable that, provided the method is suitably taught and the technique is carefully carried out, success can be assured in about 95 to 98 per cent. of cases. It is the object of this communication to ask medical practitioners to aid us in our task in ascertaining the percentage of success which can be obtained by chemical methods. There are several hundreds of these on the market and we have knowledge of their widespread use and some indication as to their value, but unless accurate information, based on a sufficiently large number of cases, is obtained, our progress must indeed be slow. The theoretical expectation of success of chemical contraceptives has been evolved, and it is necessary to ascertain to what extent theory and practice agree. Two questionnaires have been prepared: No. 1 is intended for medical practitioners to answer; No. 2 is intended for members of the general public to answer. Any number of copies of either of these will be sent to any practitioner who is willing to help us.

FORM NO 1

For the Medical Profession

Only one form should be used for each patient. Please specify the *trade name* of method used since it is only by this means that accurate information can be obtained which will indicate the reliability of the product, or methods, concerned.

QUESTIONS

1. Serial number or symbol indicating patient
2. Age at marriage
3. No. of pregnancies
4. Miscarriages, abortions, or still births
5. Contraceptive method (if any) originally used
6. Why abandoned?
7. Contraceptive method recommended by practitioner:
   (a) Mechanical. (b) Chemical. (c) Jellies.
8. Method preferred. Any combination of the above methods is to be specified
9. How long used?
10. Successful or not?
11. Reasons for failure
12. Observations:

No. 1, which is printed above, he will obviously answer himself, and No. 2, which is similarly worded but more suitable for lay persons, can be given to any of his patients whom he thinks may be interested. Each form is numbered and hence no names are required, but the practitioner is at liberty to add any identification marks, or numbers.

CECIL I. B. VOGE, Ph.D., B.Sc., F.R.S.E.
E. F. GRIFFITH, M.R.C.S., L.R.C.P.

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RECENT ADVANCES IN THERAPEUTICS

THE TREATMENT OF ADDISON'S DISEASE

Since the discovery by Swingle and Pfiffner of the cortical suprarenal hormone and their demonstration that is capable of maintaining life in the bilaterally suprarenalectomized animal, much interest has attached to the functions of the suprarenal cortex and to the physiological effects of extracts of this portion of the gland. The administration of the cortical hormone has been repeatedly shown to relieve the clinical syndrome of suprarenal insufficiency and to restore the organism to a normal condition, at least so far as the distribution of electrolytes and the maintenance of normal blood concentration is concerned. In experimental suprarenal insufficiency, the hormone will not only produce the above-mentioned effects, but will, in addition, preserve the experimental animal in a state of normal health. There are, however, significant differences between the bilaterally suprarenalectomized animal and the patient suffering with Addison's disease which merit consideration, for in the human subject the loss of suprarenal cortical function is partial and chronic, as contrasted to the acute and absolute insufficiency produced by bilateral suprarenalectomy in the animal. A. M. Snell reviews (*Proceedings of the Staff Meetings of the Mayo Clinic*, January 24, 1934, ix, 57) the results in the patients treated at the Mayo Clinic with the cortical suprarenal hormone between May, 1930, and January, 1934. There were 48 patients, of whom 32 have died. Two patients were admitted in extremis; four died because they voluntarily discontinued treatment; 14 died because of the inability to obtain adequate amounts of the hormone during the periods of crisis, and 12 died in spite of what presumably was adequate treatment. On reviewing these records, however, it is apparent that many of the patients were lost because they were on sub-maintenance dosage of the hormone. In certain instances, suprarenal insufficiency developed so quickly that it was extremely difficult to institute adequate dosage of the hormone in time to prevent a fatal outcome. Of the 16 living patients, 7 are in good condition one or more years after treatment was begun, 6 have been under treatment for less than six months and are doing well at present, and 3 are in poor condition because of inadequate supplies of the hormone. In checking over the whole group to determine whether or not the use of the hormone has prolonged life, on the average it is apparent that there has been a slight but definite gain in this respect. During the last year, recognition of the value of sodium chloride in the treatment of this disease has produced a decided improvement in the results, and it is apparent that patients who have proper treatment probably should have a considerably better expectancy of life than formerly. The reduction of morbidity alone makes treatment decidedly worth while, and certain medical and surgical complications in cases of Addison's disease can now be dealt with in a very satisfactory manner. The principal stumbling block in treatment has been the high cost of the hormone.

A NEW TREATMENT OF OSTEOMYELITIS

Many therapeutic procedures for the treatment of osteomyelitis have been advocated, and several are still in more or less common use. Notable among the methods employed at present are the establishment of drainage gutters by surgical means, irrigation with Dakin's solution, Orr's method, maggot therapy, the use of bacteriophage, and packing with a paste made of glycerine and magnesium sulphate. One of the most recent of these methods, and apparently the most successful, is that of the late William Baer, of Johns Hopkins Hospital, in which sterile living maggots, which feed exclusively upon necrotic tissue, were used. Baer suggested that possibly some biochemical action might be responsible for the success of the maggot treatment, and with this idea in mind, M. A. Stewart, of the Rice Institute, Houston, Texas (*Surgery, Gynecology and Obstetrics*, February, 1934, lviii, 155) began a series of experiments in an attempt to determine how maggots effect a cure in cases of osteomyelitis and to try to find a chemical substitute for them. He found accidentally in the course of his investigations that maggots exude calcium carbonate through their body walls, one hundred maggots excreting an average of 0.6 milligrams of this substance each 24 hours. This discovery was significant because here is calcium carbonate being eliminated constantly, even if in small quantities, in the wound, and because, as Beckhold (1929) has pointed out, calcium ions can stimulate phagocytosis. The next step in the problem was to find a way by which the leucocidin, excreted by the bacteria, might be controlled; because, unless it could be eliminated rapidly or rendered inert, the phagocytes would be killed about as rapidly as they appeared at the focus of infection. Therefore, it became necessary to develop a theory relative to the chemical nature of leucocidin in order to devise a way of rendering it inert. Speculation on this aspect of the problem led to the belief that the exotoxin might be protein in nature, i.e. a polypeptid or an amine, and, if so, a dilute aqueous solution of picric acid would readily render it insoluble and thereby inert. On the basis of the data and hypothesis mentioned, experimental treatments were started, and eventually it was found that when a 0.25 per cent. saturated aqueous solution of picric acid, containing 8 per cent. glycerine (to reduce surface-tension and allow access to all the crevices of the wound), was used along with an autoclaved aqueous suspension of calcium carbonate (20 grams calcium carbonate to 215 c.cm. distilled water), progress was very marked and rapid in its course. Clinical work has confirmed the value of this method of treatment, which is very simple. The necrotic bone is first removed surgically, the excavation being made long and narrow so that the strength of the shaft may be retained and because the cavity will close more quickly. Following the operation the wound is packed for 24 hours with vaseline gauze to allow the trauma to subside somewhat. At the end of this time the vaseline gauze packing is removed and the wound thoroughly irrigated with the picric acid glycerine solution by means of a syringe. Within a few seconds an aqueous suspension of calcium carbonate is sprayed into the wound by means of a nasal atomiser until a thin layer of precipitate is laid down over the osseous and soft tissues. The calcium carbonate combines with the picric acid solution to form calcium picrate. The wound is then packed with dry gauze in order to prevent closure. Ordinarily these treatments are given three times a week, but in very severe cases they are given daily for the first week or two.

A NEW METHOD OF TREATING PEPTIC ULCER

Several years ago attention was called to a method of treating peptic ulcer by a combination of lipo-proteins with emetine. The use of non-specific proteins in the treatment of gastric and duodenal ulcer is not new, and experiments with these substances have shown that they exert a definite action on gastric and intestinal motility. Clinically the use of lipo-proteins in place of proteins has been found advantageous because their action, while similar, is not attended with a shock reaction. Felix Cunha (*American Journal of Surgery*, February, 1934, xxiii, 219) publishes a report on a series of patients who were treated with a combination of lipo-proteins and emetine, known as synodal. The series can be divided into two groups: First, 29 cases in which treatment was completed more than a year ago; each case was checked every three months for one to two years. Second, 22 cases treated during the past twelve months which are being checked every three months but in which varying periods of less than one year have elapsed since completion of treatment. Each patient was given one ampoule of synodal solution intravenously every fourth day for 10 doses. A fine gauge needle was employed. The usual time of administration was about three or four hours after the noon meal in order to avoid the possibility of vomiting, due to relaxation of the cardia. The injection was made with the patient in the prone position, and this was maintained for five minutes because of the complaint of slight dizziness in a few cases. In no case was any reaction seen. Smoking, coffee, tea and alcoholic beverages were prohibited during the course of treatment. For the first ten days a bland smooth diet consisting of soft-boiled eggs, toast with butter, clear bouillon, consommé, a puréed vegetable, custard, and six glasses of milk daily, was given. After ten days fruit, cereal with cream, chicken, and lamb chops were added to the diet. At the end of four weeks patients were allowed to resume their normal daily dietary routine. Except for 3 patients who were markedly anæmic and were kept in bed for two weeks, all were ambulatory and able to follow their occupations. As a laxative, mineral oil, or a mineral oil and agar preparation, was advised. In all except two cases complete relief from pain occurred promptly. All of the patients gained weight, the average gain being 8 lbs. during the period covering the ten injections. Clinical symptoms disappeared, repeated X-ray examinations showed structural changes in the ulcers which are associated with the process of healing, and there was a definite change in the gastric acidity. Although the total number of cases reported is comparatively small, the method appears to be worthy of wider clinical trial.

THE TREATMENT OF ANÆMIA IN CHILDREN

The treatment of patients with iron compounds is of very old date, but its value is still much disputed. Iron has at times been administered in inorganic compounds, at times in organic ones and at other times as reduced iron. Later years have brought several new points of view, based on clinical and experimental investigations. Ferrous compounds are more effective in chlorosis than ferric compounds. The clinical effect of ferric salts is due to their being partly reduced in the intestinal tract. Reduced iron is dissolved as ferrous chloride if there is free hydrochloric acid in the stomach, and 10 cg. of reduced iron is dissolved in 35 c.cm. of tenth-normal hydrochloric acid—an amount which is present in the stomach under normal conditions—forming a ferrous compound, which may be absorbed. Iron may, however, also be dissolved in the small intestine, the contents of which have an acid reaction. The amount of iron converted also depends on the dose administered and, in small doses, reduced iron is inefficacious in cases of achylic anæmia, a fact which supports this diagnosis against that of chlorosis. Most cases of anæmia in children are due to a scarcity of iron in the food, to infections, to too early birth, or to twin birth. The aim of the investigations recently published by M. C. Lottrup (*American Journal of Diseases of Children*, January, 1934, xlvii, 1) has been to examine the effect of ferrous and ferric compounds, reduced iron and a copper compound on anæmia in children. The preparations used were ferrous chloride (or ferrous sulphate), dissolved in a simple syrup, and colloidal ferric hydroxide. Ferrous salts are easily oxidized, and become ferric salts; it is therefore necessary to add a little citric acid and keep them exposed to light. The reduced iron used was the purest product obtainable. The effect of the two iron compounds on anæmia was very different. The ferrous salt quickly caused a rise in the hæmoglobin percentage, the ferric hydroxide having but slight effect. After some time, when the effect was definite, the ferrous and ferric compounds were interchanged, and the hæmoglobin percentage at once rose in the child who now received ferrous salt, while the one who now received the ferric compound did not show further improvement. During one period the dose of the iron compound was doubled, half of the preparation being lost through vomiting. Examination showed in every case the superior effect of ferrous salt on anæmia in children. Ferrous salts are the most effective iron compounds for the treatment of simple anæmia, but they also possess other advantages. Of fourteen persons (doctors, nurses and medical students) who were given 25 cg. of reduced iron (a small therapeutic dose), seven had heartburn, two who suffered from dyspepsia felt quite ill, with aggravation of their dyspeptic symptoms, and all except one had evil smelling and tasting eructations of hydrocarbons and hydrogen disulphide, originating in impurities in the iron. The same persons took 27 cg. of ferrous sulphate (i.e. 10 cg. of iron, the ordinary therapeutic dose) several times without discomfort. Only one person had tasteless eructations. The author has therefore no doubt that for the treatment of simple anæmia ferrous compounds should be used (ferrous sulphate, chloride, lactate or carbonate).

REVIEWS OF BOOKS

Report of the Medical Research Council for the year 1932–1933. London: H.M. Stationery Office, 1934. Pp. 161. Price 2*s*. 6*d*.

In the introduction to this report, which covers the period October 1, 1932, to September 30, 1933, the Council publicly repeat the sympathetic tribute, in the resolution passed at the time of his death in June last year, to Sir Walter Fletcher, who had been Secretary from the outset in July, 1914; his " gifts and character which were so influential in determining the policy of the Council in its early days, and which imparted so strong a momentum to the work of its maturity, will find in the continuing progress of that policy and that work their best and most lasting memorial." Professor J. J. R. Macleod of Aberdeen has been obliged by reasons of health to resign, and his place on the Council has been taken by Sir Thomas Lewis, who, until his Directorship of Clinical Research at University College Hospital was endowed by the Rockefeller Foundation, had been in the service of the Council. For the all-important post of Secretary the Council have been so fortunate as to obtain Professor Edward Mellanby. Under the heading of " the changing problems of disease " attention is directed to the diminution of epidemic diarrhœa and vomiting in children, to the disappearance, although unexplained, of chlorosis, and to recent advances in other directions, such as dental and deficiency diseases, diabetes and endocrine disorders. There has recently been a clearer understanding on the relations of diet and anæmia on which research is proceeding in various centres, such as Birmingham and Manchester, besides the Metropolis. The National Institute for Medical Research under the direction of Sir Henry Dale, has a large staff engaged on widely different lines of important work, such as the virus, responsible for influenza, bacteriophages, acetylcholine, and the determination of biological standards and the methods of biological allay and measurement. At University College Hospital the Council provides generous assistance to an active department of clinical research, where erythromelalgia and the mechanism of headache are, among other subjects, being investigated. The external research schemes are widely distributed over the country, and the impressive record here presented proves what an enormous influence the Medical Research Council is exerting on medical science.

The Chances of Morbid Inheritances. Edited by C. P. Blacker, *M.C.*, M.A., M.D., M.R.C.P. London: H. K. Lewis & Co., 1934. Pp. xi and 449. Illustrations 107. Price 15s.

That there is an enormous amount of material available about the inheritance of disease has been shown by Edward Nettleship about the eye, in which knowledge of transmission is, as Sir Stewart Duke-Elder points out in his article in this volume, based on a broader basis of statistical material than in most other branches of medicine. As regards the skin, which is also so easily examined, Dr. Cockayne in his encyclopædic " Inherited Abnormalities of the Skin and its Appendages " (*vide The Practitioner* 1933, cxxx, 618) has shown what an extensive amount of information one man may collect. One of the objects which the Eugenics Society had in bringing out this work was to stimulate in this direction the co-operation of those in general practice who have the most ample opportunities, medical officers of health, and consultants, and thus to increase the accuracy with which eugenic prognoses can be given, for example, in response to the question: "If I marry, ought I to have children?" In this well edited volume, which by its title recalls Professor Karl Pearson's "Chances of Death" published thirty-seven years ago, the General Secretary of the Eugenics Society has collected nineteen able contributors, of whom Professor Ruggles Gates sets out the principles of genetics and in the appendix Professor Lancelot Hogben shows, with the help of algebraic formulæ, how to analyze a pedigree. The remaining and intervening articles are all by medical men and deal with inherited diseases arranged under the various systems of the body. Thus Dr. Russell Brain writes on those of the nervous system, Dr. A. J. Lewis on mental disorders and Dr. H. Herd on mental deficiency. In his essay on hereditary cardiovascular disease Dr. Maurice Campbell concentrates on rheumatic heart disease and those coming under the heading of arterio-sclerosis, such as cerebral hæmorrhage, angina pectoris and coronary thrombosis. Dr. L. J. Witts has appropriately taken charge of the diseases of the hæmopoietic organs, for it is not four years since he crystallized our knowledge of simple achlorhydric anæmia and discussed its relation to the idiopathic anæmia described by Addison, his predecessor at Guy's, in the middle of the last century. Dr. Osman deals with the hereditary diseases of the kidneys, Dr. Lawrence with diabetes mellitus and renal gylcosuria, Dr. Gardiner-Hill with thyroid diseases, and Professor H. A. Harris, now on his way to Cambridge, with skeletal abnormalities.

Radiotherapy in the Diseases of Women. By MALCOLM DONALDSON, B.A., M.B., B.CH., F.R.C.S. London: Hodder and Stoughton. Pp. 131. Price 7s. 6d.

To give a complete account of the treatment of gynæcological conditions by radiation in so short a space would indeed be a difficult task. The author, as he says in his preface, has not set out to do this, but he has compiled a very useful volume for which the busy practitioner, who is interested in the subject, should be grateful to him. Of the three sections into which the book is divided, the first is concerned with physics, biological action, and general methods of treatment; the second, under the heading "Cancer," describes the treatment of malignant conditions, and includes the author's views on the cancer problem as a whole. The last deals with the radiation treatment of uterine hæmorrhage due to benign conditions. The various techniques used in the treatment of carcinoma of the cervix are described in a manner which is easy to follow, and the results obtained at several clinics shown in tabular form. The treatment of carcinoma of the body is regarded by the author as mainly surgical and is dismissed in three pages. Interstitial treatment of carcinoma of the vulva is described in some detail, though the difficult problem of the secondary glands is somewhat neglected. The chapter on uterine hæmorrhage is admirable, and should be of particular interest to the general practitioner, for the claims of radium and X-ray treatment are discussed fully and without bias. It is perhaps unfortunate that little more than half the book should be devoted to therapy, and it is doubtful if the chapters dealing with elementary physics and with general methods of treatment deserve so much space in a book of this size. Some of this space might, with advantage, have been given to such questions as the general treatment of the patient, complications arising during and after treatment, and the after-care of the patient. The task of condensing such a wide subject into so small a compass is an arduous one, and the author is to be congratulated on the result—a handy volume which commends itself to those who desire to know the present position of radiotherapy in gynæcology.

Recent Advances in Vaccine and Serum Therapy. By ALEXANDER FLEMING, F.R.C.S., and G. F. PETRIE, M.D. The Recent Advances Series. London: J. & A. Churchill, 1934. Pp. x and 463. Figs. 5. Price 15s.

THIS addition to the " Recent Advances Series " is of great value not only for the authoritative qualifications of Professor Fleming, who for more than twenty years has worked with Sir Almroth Wright, the pioneer of vaccine therapy, and of Dr. Petrie, the bacteriologist-in-charge of the Serum Department at Elstree of the Lister Institute, but for the full summary of the work done by others in these subjects. The first part of the book on serum therapy is by Dr. Petrie, who adds two chapters on the vaccine and serum treatment of certain diseases in man, such as rabies, typhus, yellow fever, chicken-pox, mumps and Rocky Mountain fever, caused by filter-passing viruses, and on vaccines and sera in veterinary practice, which, it is pointed out, should certainly be included, as an artificial division between the specific prophylaxis and treatment of man and of animals cannot logically be justified. The first chapter, dealing with general conditions, contains a useful account of serum sickness and points out the special liability of " horse-asthmatics " to manifest these symptoms after the first administration of serum; on the other hand a number of statistical records are quoted to show how seldom allergic shock proves fatal in clinical practice. The sera employed in various infections are fully described from every aspect including their preparation; for example, the section on the practical subject of the prophylaxis of measles by means of serum contains accounts of the storage and organization of the supplies of the effective serum. For the second part of the book, on vaccine treatment, Professor Fleming is solely responsible and shows a wise critical faculty in adjudicating on the effects of the treatment in certain diseases; thus in the discussion of gonococcal infections, which have been thus treated for thirty years, most of the superabundant reports are regarded as of but little value; there is, however, evidence of the ultility of vaccines in diminishing the number and severity of complications, such as arthritis, but in these conditions the beneficial effects may be of a non-specific character. Vaccines have been used at St. Mary's in chronic rheumatic conditions for twenty years, and this experience shows that benefit is more obvious in the non-arthritic manifestations. Patients often have a feeling after the initial inoculations of well-being which is not paralleled by obvious physical signs of improvement, and the explanations for this are discussed, the suggestion that it is psychological being shown to be improbable. Each chapter is followed by a select bibliography and adds to the utility of a guide which few medical men will not find it wise to have at hand.

Recent Advances in Medicine. By G. E. BEAUMONT, D.M., F.R.C.P., and E. C. DODDS, M.V.O., M.D., F.R.C.P. London: J. & A. Churchill, 1934. Pp. xvii and 485. Figs. 58. Price 12s. 6d.

THREE years have passed since the sixth edition of this well known book appeared. In this, the seventh edition, the authors have incorporated a mass of new and valuable material in the comparatively short space of one hundred extra pages. These additions should be highly appreciated by the many clinicians and laboratory workers who keep this book in constant use. Of this new material special reference should be made to the chapter dealing with that difficult subject—the sex hormones. The section on the kidney has been considerably amplified by several additions, of which must be mentioned the urea clearance test, the ketogenic treatment of urinary infections and especially that on œdema. The value of sanocrysin in pulmonary tuberculosis is well discussed in a section containing the author's results in a series of cases. They conclude that the immediate and ultimate results are often disappointing. It is impossible to refer to all the fresh material in this book. Suffice it to say that it has been brought thoroughly up to date.

Saint Bartholomew's Hospital Reports. Vol. LXVI. London: John Murray, 1933. Pp. xxiv and 363. Illustrations 49. Price to subscribers 15s.; to non-subscribers one guinea.

EDITED by a Committee of nine, three of whom are secretaries, this volume contains matter of very varied interests. There is a symposium on sympathectomy, consisting of nine demonstrations, the first on the anatomy of the sympathetic nervous system by Mr. R. E. Morrish, the others on the results in different conditions. In a remarkably complete manner Mr. R. W. Raven gives the results obtained about the end-results of the various forms of treatment of cancer of the breast and of cancer of the buccal cavity by the efficient follow-up department of the hospital, established in 1922. There are several articles of scientific interest which point to the amount of research undertaken, such as Dr. L. P. Garrod's account of inhibitory selective culture media with original observations on the selective cultivation of *Streptococcus pyogenes;* tissue culture in its relation to surgical pathology, in which Mr. H. J. Burrows pays a well-deserved tribute to the late T. P. Strangeways; the clinical chemistry of alcaptonuria and melanogenesis, by Dr. G. A. Harrison, thus recalling Sir A. E. Garrod's work on the inborn errors of all metabolism and chemical malformations, and Dr. W. G. Oakley's on the blood urea clearance test. Mr. J. Beattie discusses maternal obstetrical paralysis and records three cases. Miss M. H. Hart's attractive and exhaustive essay on pre-reformation nurses in England was awarded the Nutting-Dock prize by the National League of Nursing Education of America, which demands original investigation. Dr. Branson records his observations on the health of the nurses serving their four years' indenture to St. Bartholomew's Hospital. There are two articles dealing with past members of the hospital staff; Sir D'Arcy Power writes sympathetically of his contemporary, Richard Gill, who was anæsthetist for 33 years and was a notable winner of examination honours; this *In Memoriam* contains an interesting description of the conditions when Gill was house-surgeon, which contrasted so markedly with those of the present day. The essay which won the Wix Prize (1933) on the life and works of Percivall Pott, by Mr. G. M. Lloyd, is of outstanding merit.

A Short History of Some Common Diseases. By Divers Authors, edited by W. R. BETT, M.R.C.S., L.R.C.P. Oxford University Press. London: Humphrey Milford, 1934. Pp. 211. Price 10s. 6d.

THIS well got-up volume deals in sixteen articles with many but, as the title admits, not with all the diseases to which human flesh is heir; thus influenza is not separately described, though it is mentioned in Dr. E. M. Brockbank's article on pneumonia. The editor, who should be congratulated on the way in which he has done his work and on the collaborators he has secured, contributes a very interesting account of appendicitis in which there is an account of the early operation performed in Guy's Hospital in 1883, the patient two years later, though an inmate of the Barming Health Lunatic Asylum, being quite free from his old disease. Sir D'Arcy Power gives the history of venereal disease, Sir John Broadbent of the acute infections, Professor John Fraser of tuberculosis and his colleague Professor Wilkie of gallstones. Dr. Leonard Findlay writes on rickets, Dr. Poynton on rheumatism, Dr. James Collier on epilepsy, and his colleague Mr. Lionel Colledge on tonsils and adenoids, Sir John Collie whipping in with malingering.

Lessons on the Surgical Diseases of Childhood. By WILLIAM RANKIN, M.B., Ch.B. Glasgow: Alex. MacDougall, 1934. Pp. 190. Illustrated. Price 21s.

There is one part of this book which is excellent beyond argument, the photographs of pathological conditions, coming largely from the collection of the late Mr. H. J. Nicoll. Apart from this it is disappointing, there being neither the systematic statement of the elements of each condition that would be useful to the student, nor the detailed account of treatment required by the operating surgeon. Throughout the book, as Mr. Rankin says in his preface, the methods are those of "the older surgery": for anæsthetics chloroform is recommended; for tonsillectomy the guillotine; for talipes equino-varus tenotomies in the early stages and astragalectomy in the late; for cleft palate the simple suturing of the edges of the cleft.

NOTES AND PREPARATIONS

THE "MEDICAL SICKNESS SOCIETY" JUBILEE DINNER

The Medical Sickness Annuity and Life Assurance Society, which was founded in 1884, celebrated its jubilee by a dinner on March 1st, at the Dorchester Hotel, with Dr. F. C. Martley, chairman of the board of directors, in the chair, and a large and representative number of guests. The toast of "The Society" was proposed by Sir Humphry Rolleston, who spoke of that unusual personality, Ernest Hart, the editor of the *British Medical Journal*, who founded the society. Dr. Martley, who replied, traced the development of the society from small beginnings till now, when its assets were over £1,000,000. This money was under the management of doctors only and there were no shareholders to absorb the profits. Sir William Willcox proposed the toast of the guests, and Sir Arthur Robinson, permanent secretary to the Ministry of Health, and Lord Horder replied.

THE INVESTORS GENERAL FIXED TRUST

One of the most interesting developments in investment practice during recent years has been the success of the fixed trust movement, indicating the soundness of the principles underlying this form of investment and the widespread need which it fills. The appreciation of a large class of professional men of the convenience and security afforded by the fixed trust method of investment is no doubt largely responsible for the success which has attended the movement since its inception. In order to secure the same diversification over a wide range of companies by any other method, it would be necessary for the investors to be possessed of substantial capital and to bear the inconvenience of attending to some 50 half-yearly dividend warrants. A single investment in the fixed trust under sound management and trusteeship affords an equal degree of security through diversification, together with the convenience of having one single investment, from which income is received at regular half-yearly intervals. A new trust has just been formed which is described as The Investors General Fixed Trust, particulars of which are published on another page, and which has been formed under the influential auspices of Messrs. Dawnay, Day & Co., Ltd., the well-known merchant bankers, with The Royal Exchange Assurance acting as trustee for the holders of the Trust's certificates. The annual income yield shown is approximately 4¾ per cent. This type of investment appears to be eminently suitable for the practitioner who wishes to spread his money over a wide field and who, like most practitioners, has neither the time nor the inclination to keep in touch with a large number of different investments.

ANTIVIRIN NASAL JELLY

This preparation, issued by the Glaxo Laboratories (Osnaburgh Street, London, N.W.1), consists of sterile detoxicated filtrates from cultures of *B. pneumoniæ* (of Friedländer), *M. catarrhalis* and mixed streptococci, incorporated in a glycerine base, along with 1 per cent. of ephedrine, and is designed for the treatment of the common cold. The action of the antiviruses is to prevent the growth and multiplication of the organisms which are most commonly found in the nasopharynx in cases of the common cold. Small quantities of the jelly are squeezed into the nostrils several times a day, allowing some of the jelly to pass through the back of the nose into contact with the throat. Owing to its viscosity the jelly penetrates readily into the folds of the mucous membrane and thus brings the antiviruses into contact with organisms to which access would otherwise be difficult. The idea of the preparation seems an excellent one, and this nasal jelly deserves a thorough clinical trial by practitioners.

APLONA

Aplona is the name given to a specially prepared apple powder for the treatment of diarrhœic conditions especially in children. Malyoth and Wiskott carried out researches at the children's clinic of Munich University and were able to point out the importance of pectin substances and their high power of resorption. Pectin is a cellulose derivative which is found usually in a complex combination with calcium in pulpy fruits, such as the apple. The high absorptive efficiency of this substance enables it to fix bacteria and toxins and render them inert, and the value of an apple diet in diarrhœa in children was found to depend chiefly on the presence of pectin. Aplona is convenient in use, dosage, and easy of administration. The English agents are Messrs. Coates and Cooper, 94 Clerkenwell Road, London, E.C.1.

BOLLINGER CHAMPAGNE

Messrs. Bollinger have sent us a sample of their 1928 Vintage Champagne, which is recommended as being of exceptionally fine quality, and is, in Messrs. Bollinger's opinion, the finest wine shipped since the superb vintage of 1904. Connoisseurs will recall the latter's incomparable qualities, and it should cause the highest satisfaction to all practitioners who wish to prescribe a good champagne to their patients to know that Bollinger 1928, a wine fully equal to this famous vintage, is now available.

MEDICAL SUPPLY ASSOCIATION APPARATUS

We have received the 1934 catalogue of the Medical Supply Association (167-173 Gray's Inn Road, London, W.C.1.), comprising their new electro-medical apparatus for A.C. mains, diathermy and short wave apparatus. It is well illustrated, and we note particularly the " Bio-ray " apparatus for radiant heat and infra-red applications, and the " Controtherm " portable diathermy apparatus.

THE PRACTITIONER

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SOME COMMON OCULAR SYMPTOMS

By W. J. ADIE, M.D., F.R.C.P.

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FEW of the signs and symptoms encountered in daily work are free from ambiguity; a murmur, headache, fever, or a lump, for example, heralds a fatal disease in one instance, in another all goes well. This applies to the symptoms we are about to consider, and in dealing with them features will be emphasized that may help the reader to decide whether they are harmless or call for further investigation.

THE REACTIONS OF THE PUPIL

Loss of the light reflex is the most important of the pupillary signs. Fortunately, it is now possible to distinguish its various causes, and space here will be given to a consideration of two forms of abnormal pupil, one serious, the other benign, in which the etiological diagnosis can be made from the characters of the pupils themselves. They are " the pupils peculiar to syphilis " and the " tonic pupil."

The pupils peculiar to syphilis were described by Argyll Robertson. Unfortunately—a common fate of eponymous medical pioneers—his name is now misused in that it is applied indiscriminately to any pupil which " reacts to accommodation but not to light," a finding common to various unrelated conditions. Hence it comes about that the expressions " pupils peculiar to syphilis " and " Argyll Robertson pupil " are not synonymous in common parlance as they would be if strict attention had been paid to the original description. The pupils peculiar to syphilis have the following characters : (1) The signs are present in both eyes. (2) The pupils are small. (3) The light reflex, direct and consensual, is absent; the pupils do not contract with increased illumination or dilate when they are shaded. (4) The contraction of the pupils on convergence-accommodation is prompt and complete; when the act of convergence ceases, the pupils regain their resting size *at once.* (5) The response to mydriatics is slow and incomplete. (6) Useful vision is present. If these criteria are all satisfied, the patient under examination is a syphilitic. Reasons for the inclusion of each of these six essential features cannot be given here, but comments may be made on some of them.

It is not denied that the pupil of syphilis may be found in one eye with normal reactions in the other. Nevertheless it would be rash to diagnose syphilis from unilateral eye signs alone. Several abnormalities that mimic the Argyll Robertson pupil closely, but have nothing to do with syphilis, are frequently unilateral; many published examples of alleged unilateral Argyll Robertson pupils are clearly spurious in the sense that they fail to agree with the original description, and if genuine cases occur they are certainly rare.

Careful attention should be given to the size of the pupils. The pin-point pupil does not exist outside textbooks, but the pupil under consideration is small, often very small, and care should be exercised if it is more than 3·5 mm. in diameter. Error will be avoided if the reaction on convergence is tested carefully; if the pupil is large it will probably be found that this reaction, as well as the light reflex, is defective in some respect. This at once places it outside our category; it is a " partially fixed " pupil; of this, syphilis is but one of many causes. The pupils of syphilis do not contract when the illumination is increased *or dilate when they are shaded;* their size is constant, day in, day out, whereas the pupils in several conditions which resemble the Argyll Robertson pupil, in that they react to accommodation but not to light, differ from it in that they vary in size from time to time and dilate when shaded. A prompt response of good range on convergence is essential; equally important is a prompt return to the resting size after convergence ceases. These features distinguish the pupil of syphilis from those showing tonic reactions and prevent the error of mistaking this harmless anomaly for a sign of serious disease. The proviso that vision must be fairly good is necessary because the pupil of an eye blind from any cause may react on accommodation but not to light. This is not to say that vision may not be somewhat impaired. The commonest cause of progressive optic atrophy is tabes. Its victims are often seen in the earliest stage of the disease; there is not any ataxy and the tendon reflexes may still be brisk. In cases of this kind the diagnosis of tabes is based on the association of optic atrophy with fair vision and complete abolition of the light reflex. If optic atrophy were the only lesion, say from pressure by a tumour, and vision were still fair, the light reflex, though possibly defective, would still be present. In the first case there must be some other lesion causing loss of the light reflex, and the only disease in which the two lesions are likely to occur is tabes. Conversely, if with failing vision from optic atrophy, the light reflex persists, then tabes is unlikely. On two occasions in my experience tabes had been diagnosed and a hopeless prognosis for vision had been given because the Wassermann reaction was positive in the blood and the ankle jerks were absent. The fact that the pupils still reacted to light, although vision was grossly defective, threw doubt on the diagnosis of tabetic optic atrophy, and after further investigations a pituitary tumour was removed, with restoration of vision.

To recapitulate: small pupils, unaltered by light or shade, contracting and relaxing promptly during and after convergence, and dilating slowly and completely under mydriatics, vision being good—these are the essential features of the pupils peculiar to syphilis; they may, in addition, be unequal or irregular and the lids may droop or be retracted. If these are the ocular signs, and these alone, syphilis is as certain as any inference based on physical signs can be. Syphilis often produces other combinations of pupillary signs; the point is that no other is peculiar to syphilis.

The tonic pupil is seen most often in females; it is usually unilateral and larger than its fellow. It does not react to light, but reacts on convergence in a peculiar way; at first there may be no response, but after a few seconds it contracts very slowly to a size often much smaller than the other, normal, pupil. If the patient then looks into the distance it remains small for a varying time and then dilates very slowly, taking perhaps several minutes to reach its usual resting size. During this time the patient is surprised to find that the pupil which is usually the larger one is now the smaller. The abnormality is often detected during a routine examination; sometimes patients complain of the unsightly inequality of the pupils; many of my patients have been doctors or members of their families who sought an explanation of the defective pupillary reactions. Rarely is vision affected by slowness of accommodation. In a number of patients with tonic pupils some or all of the tendon reflexes are absent and syphilis of the nervous system is suspected. It should be well known, therefore, that a harmless, not uncommon, disorder exists, characterized by pupils that "react on accommodation but not to light," and absent tendon reflexes.

When the typical tonic reaction on convergence is present there can be no doubt as to the diagnosis, as this is peculiar to the benign disorder of which it is one manifestation. Unfortunately, in a considerable number of cases of this benign disorder the reaction on convergence, as well as the light reflex, is absent or not obviously tonic. If, as often happens, the tendon reflexes are absent as well, thoughts of grave organic disease must arise; even in these cases, however, the neurologist can usually make the correct diagnosis without submitting the patient to unnecessary tests. The presence of an inactive pupil which does not conform to either of the descriptions just given and for which no obvious cause is found calls for further neurological investigation.

Inequality of the pupils (*anisocoria*) is so often seen in healthy persons that we may be tempted to treat it lightly. In many instances, no doubt, it is due to a harmless, probably congenital, anomaly, but it sometimes precedes changes in the reactions of the pupils and other signs of nervous disease, for example, in the graver forms of syphilis. Further, many observers have demonstrated its frequent association with thoracic and abdominal disease, particularly tuberculosis of the lungs and pleura. Here it results from interference with the sympathetic innervation of the iris. Some maintain that there is always an organic basis for the sign, and the most optimistic recent estimate is that it is harmless in but one case in three. Among the various proved causes of isolated anisocoria, pulmonary tuberculosis, healed or active, is by far the most important. Anisocoria, therefore, should cause us to hesitate before we decide that symptoms have no organic basis. If it is known to be of long standing and the patient is well, we should probably ignore it; but its presence, along with suspicious symptoms or history, calls for further examinations to exclude nervous and thoracic disease, especially pulmonary tuberculosis.

NYSTAGMUS

The name nystagmus is applied to rhythmical involuntary movements of the eyes, usually of both eyes and in the same direction. It is present or may be produced in many ways in various physiological and pathological states of the labyrinths, the eyes and their connections in the nervous system. When its cause is in the labyrinth or in its central connections, two components can usually be distinguished, a quick movement of the eyeballs in one direction and a slower return in the other; in nystagmus of ocular origin the movement is more often an irregular wandering or a to and fro movement of uniform rate. It is necessary to distinguish degrees of intensity of nystagmus—slight, moderate and severe. It is slight if it appears only when the eyes are turned to the side towards which the quick component occurs; it is moderate if it is also present when the eyes are directed forward, and it is severe if it also occurs when the eyes are directed to the side opposite to that of the direction of the quick phase. Nystagmus of slight intensity appearing only on extreme lateral deviation of the eyes is very often physiological, and if the patient in whom it is found is otherwise free from signs and symptoms it may be ignored. If it accompanies organic signs of nervous disease the diagnosis must be made from these. Nystagmus is so well known as one of the classical signs of disseminated sclerosis that undue weight is often attached, both to its presence and its absence. It is well to remember that it is absent, more often than not, in the early stages of the disease, that it has been observed in many unrelated diseases of the brain and spinal cord, that it is rarely of value for differential diagnosis, and that it is not uncommon with tumour of the spinal cord, a curable condition which may thus come to be mistaken for disseminated sclerosis, a hopeless disease.

Nystagmus of moderate or severe degree is always pathological and its presence calls for an effort to determine its nature and cause. To consider first cases in which it is associated with attacks of vertigo:

if a patient with deafness or tinnitus has attacks of vertigo with intervals of freedom, the cause is in the ear; for practical purposes it may be said that disease of the central nervous system never produces this triad of symptoms. If the patient is free from deafness and tinnitus the characters of the nystagmus will not always indicate with certainty that the labyrinth is at fault. Labyrinthine nystagmus is a well sustained, horizontal-rotatory movement of moderate frequency and amplitude, usually most intense when the eyes are directed towards the side of the irritated canals. If the nystagmus is not horizontal-rotatory then it is certainly not labyrinthine; if it is, it may be either labyrinthine or central in origin. Disorder of the peripheral labyrinth is the commonest cause of vertigo, but severe attacks may result from acute lesions of the brain-stem. An important example of this is provided by disseminated sclerosis. A severe attack, often accompanied by repeated vomiting, is a common early symptom of this disease; it may be the first disturbing symptom and often precedes definite physical signs. To emphasize this point, it may be said that acute vertigo in a young person with healthy ears is most likely to be due to an acute inflammatory patch of disseminated sclerosis in the brain-stem. During such an attack nystagmus will be present; it may be horizontal-rotatory or purely horizontal, rotatory or vertical; if it is one of the last three its central origin is proved. Nystagmus of moderate or severe degree in patients free from vertigo may be ocular in origin or due to chronic central nervous disease. It must be dismissed here with the bald statement that the help of experts will be necessary for its elucidation.

DIPLOPIA

Diplopia is rarely monocular, a result of abnormalities in the refractive media. We are concerned here with diplopia which disappears when either eye is covered—binocular diplopia. To consider first the patient who complains of occasional double vision and nothing else: on examination there is not any squint and the eyes appear to follow the testing finger normally in all directions. In a case of this kind close interrogation may be needed to ensure that what the patient calls double vision is genuine diplopia, for what is meant may be a general blurring of vision as, for example, in migraine. If it is genuine, the patient has probably discovered that double vision occurs only when looking in a certain direction or that vision is normal when one eye is covered. It is advisable to insist on detailed descriptions of specific incidents; from these a decision as to the nature of the symptom can usually be made.

Where it is clear that the diplopia is genuine, examination of the patient probably does not reveal anything to account for it; perhaps he is sent to an ophthalmologist, who names the muscle at fault, but does not find any cause for the weakness. Cases of this kind are common, but an accurate statistical statement of their fate cannot be given at present. Many no doubt recover, but transient diplopia is so often the first warning of two disorders, one very common—disseminated sclerosis—the other, rare—myasthenia gravis—that the possibility of their presence must be seriously considered. Transient diplopia, lasting perhaps no longer than a few hours or days, is one of the most frequent initial symptoms of disseminated sclerosis. It often precedes other signs and symptoms by many years. A careful history may elicit an account of one or more of the other common early transitory nervous disturbances, e.g. an earlier attack of diplopia, retrobulbar neuritis, numbness of one side of the face, vertigo, incontinence of urine or numbness and weakness of one or more of the limbs. If a patient in the early half of life gives a clear account of diplopia and one of these additional symptoms, there is little room for doubt about the diagnosis. In many cases when the history makes the diagnosis of disseminated sclerosis certain, confirmatory signs are still absent. The early physical signs, singly or in various combinations, are position-loss in the finger to nose test, absent abdominal reflexes, unequally exaggerated tendon jerks and extensor plantar responses. Nystagmus, intention tremor and scanning speech are late signs.

OCULAR PALSIES

Isolated paralysis of one sixth nerve (external rectus muscle) is very common and its causes numerous. In a majority of the cases no cause is found and recovery occurs. Of the proved causes, syphilis and cerebral tumour head the list. Paralysis of one third nerve causes ptosis, loss of inward and upward movement of the eyeball, and immobility of the pupil. Severe paralysis coming on rapidly *without pain* is almost always due to syphilis. Cases in which pain precedes the onset of oculo-motor palsy fall into several fairly uniform clinical groups. The signs point to a lesion in the sphenoidal fissure at the back of the orbit or in the region of the cavernous sinus; the nature of the lesion is always in doubt, for a time at least, and I prefer the label " painful third nerve palsy of unknown origin " to " orbital periostitis " or " ophthalmoplegic migraine," or any other name which may lead to the belief that a complete diagnosis has been made. In the cases labelled " orbital periostitis " there is usually one attack only, but recurrent attacks have been described. After some hours, days or even weeks of severe pain in and about the orbit, signs of paralysis of the third nerve appear. Sometimes the sixth nerve is paralysed as well, and the cornea may be insensitive, likewise the skin of the forehead. The pain often subsides with the onset of paralysis, but it may persist for weeks. The paralysis recovers very slowly and residual signs may persist for years. It is probable that most of these cases do well. In a number, however, death results from rupture of an aneurysm or from cerebral tumour.

In the group labelled " ophthalmoplegic migraine " attacks of pain and ocular palsy recur periodically. Organic lesions, e.g. tumour, aneurysm, fibrous thickening of the third nerve, tuberculoma, have been found after death, and it is unfortunate that the name migraine has become attached to cases of this kind. Clinically there is little or no resemblance between them and genuine migraine. In migraine, periodic headache is the main symptom; it is usually bilateral, and if it is confined to one side of the head, the side varies in different attacks. Patients with so-called ophthalmoplegic migraine do not have headaches, they have neuralgic pain in the eye, temple and face, *always on the same side.* There are many other differences, but this is the important one. I have a large collection of records of patients with a history of periodical unilateral head pains, with and without recurrent ocular palsies, who died from intracranial disease, especially rupture of an aneurysm. In my opinion it is unwise to be satisfied with a diagnosis of migraine or ophthalmoplegic migraine in the presence of head pains always on the same side. To emphasize this point by paradox we may say that hemicrania is never migraine, that is if the hemicrania is always on the same side.

Space does not admit of even a bare enumeration of the many other forms of ocular palsy and their causes. They and the ones that have been mentioned must always give rise to anxiety, and every effort must be made to discover their cause, so that treatment, if available, may be given in good time.

ON SQUINT AND ITS TREATMENT

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SQUINT is the overthrow of one of the most perfect and valuable of the faculties of man. Binocular vision has made man the skilled craftsman that he is; binocular vision gives man his sense of judgment of the size and position of objects, the prime requisite for the hunter and the sportsman. Squint is the evidence of the overthrow of this priceless faculty. It may occur at any age. In children it is common and occurs as a disassociation of the eyes. In adults it is rare and mostly paretic, the sign of serious general disorder; squint of this order is most distressing to the patient, for he sees double. In this article attention will be confined to squint in children.

In a child the onset of squint does not cause the child any trouble. Evidence of diplopia is difficult to discover, but that it does occur in some cases is certain.

A child, aged four years, was seen, of whom the mother told this story. The boy fell and struck his head on the fender. She picked him up and to pacify him gave him a sweet, and noticed that he took the sweet with one hand and tried to grasp another with the other hand, then she saw that he had become cross-eyed.

For the most part the onset of a squint is a relief to a child. For some reason the maintenance of binocular vision is too difficult for it and cessation of effort brings ease. Doubled images would endanger the child, so the image of one eye is suppressed; or if both be retained, alternation of vision and suppression result, so that first one eye sees and then the other. The fact that squint brings relief to the child indicates the difficulty of treatment. The child must be persuaded to resume the struggle, and this can be accomplished only when the conditions making binocular vision too difficult can be removed and when the suppression of the fusion faculty and of the vision of the one eye have not been of too long standing.

The frequency of squint.—In a good class London school of 1,007 children there were no less than 18 squinters; amongst 374 infants there were 7, 4 girls and 3 boys; amongst 363 girls there were 7; and 370 boys accounted for 4. The incidence is therefore nearly 2 per cent., and girls are affected nearly twice as often as boys. The figures of the Belgrave Hospital for Children show how large a proportion of squinters there are amongst infants; of 1,400 children examined seriatim because "they could not see properly," no less than 199 were squinters:—

Age in years ...	4	5	6	7	8	9	10	11	12	13	14
Per cent. ...	100	100	63·2	32	7·6	17·7	5·5	5·2	7·5	2·7	5·4

The majority were of the fixed type, with one eye turned towards the nose, all but 9 were primary squint, i.e. not associated with actual disease of the eyes. The figures were —

Convergent,	fixed	166
,,	alternating	16
,,	with scarred cornea	6
,,	with disease of fundus	1
,,	congenital defect	1
,,	brain disease	1
Divergent		8

Squint is ugly. Perhaps the "evil eye," for which so many hapless old women were harried to their death on the suspicion of witchcraft in "the good old days," was no more than a common squint, a "cast" in the eye, or "bossing," as it is called in many parts of the country. Bossing had an evil significance: it indicated a despicable and worthless character, usually of decrepit age. "I speak to you auld Bossis, of perditioun," Lyndsay, "Works" (ed. 1592). Not only was squint thought to be of evil omen, but the defect was thought to be the work of evil spirits. In "King Lear," in the scene on the heath at curfew night, we read: "This is the foul fiend Flibbertigibbet; he begins at curfew, and walks till the first cock; he gives the web and the pin, squints the eye, and makes the hare-lip;

mildews the white wheat, and hurts the poor creatures of the earth." In nearer times a squint has been the cause of slanderous charges against harmless folk; in rural districts the squinter has been proverbially a thief, somewhat of the order of "Taffy" in the nursery rhyme. There is something of this feeling to-day and more than one man of business has wished to have the deformity corrected by operation, "because he found his customers seemed to doubt his probity when they noticed the squint."

EVOLUTION

Squint is a falling back into a lower state of organization. Instead of the "eyes right" direct look of the man there is the irregular fixation of lower animals. Monocular vision is the rule of lower vertebrates. A chameleon may have one eye open, the other covered, as though in sleep, one may look forwards, the other backwards. In fish there is complete absence of association of the two eyes owing to their lateral position. Two distinct optic nerves run independently to the two sides of the brain, and there is not any connection between them. In man it is otherwise, the nerves meet inside the skull, and join in such fashion that half the nerve of one eye unites with the corresponding half of the other eye, so that the brain receives the joint impression of the two images the eyes have gained of the one object looked at. There is some attempt at two-eyed vision in the higher hunting mammals. The domestic cat seems to have some such power, for it is noticeable that the eyes work together in examining near objects, and that the cat is able to "handle" an object with great nicety. With this development of the eyes in hunting animals there is a large increase in the area on the cortical centres of sight. This area is small in the hunted animals, large in the hunting animals.

In man the development is complete. The whole of his face and the position of his body has been remodelled to secure this. Man stands erect to the view; his face is flattened so that the eyes are in front, where alone they can work together; the obstructing snout has gone. Man's eyes now work on parallel axes, and they can be turned in towards each other so as jointly to examine near objects. There is constant association of the two eyes, this gives binocular vision, and the ability to determine accurately the size, the bulk and the position of objects. This judgment is effected by an unconscious, but trained, perception of the nerve impulses required by the muscles of the eye-balls in moving the eyes from one position. Abnormal stresses of this mechanism will give false impressions, both of size and distance, as I have shown by experiments with prisms.[1] Binocular vision cannot be understood by the unfortunate person who has not the power; he cannot realize what he misses. It is something like colour vision; to the normal person red is a glorious colour, to the colour blind it is no more than drab, and no power can enable such a person to understand the raptures of the artistic over fine colour-effects. So with the tone deaf.

Control.—The brain is the real factor in the production and maintenance of binocular vision. This control goes by the name of the "fusion faculty"; i.e. the power of the brain to fuse into one picture the two images seen by the two eyes. Since there is a separation of about three inches between the eyes the view of each eye of the same object is slightly different. These two diverse retinal images are received by the brain and fused to give that sense of solidity we perceive, whether of trees, of statuary, or of persons. This is the basis of stereoscopic photography. Binocular vision is not present at birth. It comes into play about the fourth week of life; then it is weak, just as uncertain as a child beginning to walk. A little irritation; even a pin prick, will cause the eyes to squint. Bacon noted the ease with which children squinted:

"Some can squint when they will, and children set upon a table with a candle behind them, both eyes will move outwards, to seek the light, and so induce squinting." There is an even more interesting note in the famous diary of Pepys. He writes: "At supper the three doctors of physic again in my cabin, when I put Dr. Scarborough in mind of what I heard him say: that children do, in every day's experience, look several ways with both eyes, till custom teaches them otherwise; and that we do now see but with one eye, our eyes looking in parallel lines."

Once binocular vision is established it is rarely disturbed; but under five years of age, should the control of the brain be weak, a very little ocular or physical disturbance will cause a squint to appear. The case may be illustrated by a simile: the relation between the eyes, the muscles, the nerves, and the brain control of the whole, is very like that between the horses, the traces, the reins, and the driver of a four-in-hand. A good driver will master a bad team. If the driver be bad or drunk, even though the team be perfectly matched and the equipment perfect, the fool of a driver will run the coach into the ditch. So with the eyes. There may be ill-matched eyes, high errors of refraction, even a gross muscle defect; but if there be perfect brain control there will not be squint, though there may be intolerable "eye-strain." On the other hand, there may be a perfectly matched pair of eyes, with good focus, normal muscles and nerves, yet if the brain control be weak the least difficulty will result in squint. A pin prick, or worms in infants, fevers, falls, or the first turn of school work in later years, will be enough to upset a weak control. These incidents are debited with the disaster, but the real fault is with the brain.

Effects of squint.—It is obvious from the foregoing that it is very important to check the squint at its onset, for it means the stoppage of a most important piece of brain work, one that has taken æons to weld into the brain fibre of man, and the loss of which is something that cannot be measured in vulgar fractions. Besides that there is the possible loss of the sight of one eye, a serious prospect in these days of rigorous physical examinations for the services and industry. An eye with a fixed squint speedily loses its acuity. If this were not so, the child would see two objects—two steps, two doors—and the confusion would be distressing and dangerous. In the child the central association that makes binocular vision is so lightly joined that when double vision is noted with the onset of a squint it may be lost in an hour or so. If a squint be neglected the squinting eye may become completely blind for all the finer purposes of life.

Popular fallacies.—There is a common belief that children " grow out of squint." There is some truth in the idea. Many a young child has been seen to squint when ill. Irritation may make it squint, and when the irritation is withdrawn the squint will cease. Then some children have squinted into their teens, and when puberty comes the eyes of a few are noted to get straighter, so that the squint may pass unnoticed except when they are tired. The temporary squint of the infant does not do any harm, but is a warning of a possible weak brain control, and a hint for future care. But the case of the child who grows up with a squint is otherwise, even though the eyes appear straight they never recover the effect of the squint, binocular vision is lost and the sight of one eye may be reduced to the value of a rabbit's eye, an eye with a general field of vision, but no form vision.

Heredity.—In some cases of squint there is a strong hereditary factor. The disorder may be traced in several generations of one family; but what is inherited is not the squint, but the conditions favouring its onset. In some rare cases the squint is associated with gross failure of development of certain muscles of the eyes through several generations; in these cases it may be said that there is a true inheritance of squint. From these gross cases a series can be traced to lesser defects of the musculature which cause the various heterophorias or latent squints that are such a serious cause of chronic headache and eye-strain. I am inclined to the view that of the three factors which are the determining causes of the failure of brain control resulting in squint—errors of focus, toxic conditions, and defects of muscle balance—the last is the most influential. In fœtal life the eye is far too large for the orbit, the developing muscles are crowded into a retro-bulbar position and only reach their proper attachments to the globe as the growth of the face overtakes the eyes. In some fish there is a regular failure of certain muscles to attain the usual attachments. In the herrings and some salmon the internal rectus fails to gain an attachment anterior to the equator of the eye, it is attached close to the optic nerve. In the pleuronectids the external rectus is " deficient " in form as judged by the usual standards. Careful investigation of patients shows how common are defects of muscle balance, and also that there are some families in which this error is larger and more common than ordinary. In one family with an excessive incidence of obvious squint, in young children of different branches of this family I was able to note the threshold of squint and to check its onset by the correction of discovered hyperphoria or latent vertical squint. In some cases of patent squint it is possible to determine the presence of muscle defect, but for the most part the finer defects are smothered by the grossness of the squint.

TREATMENT

The treatment of squint has three distinct stages: (1) Balancing the vision of the eyes. (2) Awakening the fusion faculty. (3) Operation. The three stages are intimately connected, and follow out of each other. Not every case need go through the three stages, for cure may be effected in the first stage; but no cases should reach the third stage of treatment without passing through the previous two.

Balancing the vision.—To secure a balance of vision, two courses are needed. It is necessary to correct any error of focus of the eyes. There must be complete cycloplegia from the efficient use of atropine, and the practitioner must be master of the art of retinoscopy. It is evident that in young children success must depend upon the judgment of the surgeon, subjective examination is valueless. A far harder part of the examination is the attempt to discover muscle defects. In many cases, as has been said, the grossness of the squint prevents this, nevertheless there should be careful tests, for the discovery of a vertical element in the squint and its correction by prisms may materially hasten recovery; and further, such defects have important bearings when operation has to be planned. Glasses must be worn constantly. It is never too early to begin. Infants under one year of age will wear glasses. A satisfactory means of fixing them is in use.[2] There must follow the provision of glasses the compulsory exercise of the vision of an eye with a fixed squint. The integrity of the macula of that eye, so far as ophthalmoscopic examination can determine, must be assured. To awaken the squinting eye to its duties there is no better practice than that introduced by Erasmus Darwin in 1778[3]; he covered the fixing eye or straight eye so as to compel the use of the squinting eye. The straight eye may be covered for a month on end. In some cases the squint can be altered by this measure, as Mackenzie[4] noted. This is a favourable result. Another means of securing continuous use of the squinting eye is by paralysing the accommodation of the straight eye with atropine, this compels the use of the squinting eye for the examination of near objects. It is only of value when there is some vision in the squinting eye.

Awakening the fusion faculty.—This stage demands very great patience, care and critical judgment. It is an attempt to revive the brain control of the eyes. Orthoptic treatment has been widely used of recent years, but its inception is of old. Erasmus Darwin, who had a case of alternating squint, concluded that the condition was due to a " depraved habit of moving the eyes." To check this he anticipated the most modern stereoscopic device. A brass gnomon was fixed to the nose of the child. This long nose projected 2½ inches. He argued that the child must now use the right eye to see things on the right side and *vice versa.* He then tried to get fusion of the images seen by the eyes by placing a white-tipped wand in front of each eye and then bringing them together. This was practised every hour of the day, and he thought with some effect. But he regretfully noted that his little patient discarded his device of the long nose so soon as his oversight was withdrawn ! That trial is in brief the most modern treatment of the fusion faculty. Javal, a distinguished French oculist, developed the stereoscope for this purpose, making the mirrors adjustable to the angle of the squint. Priestley Smith improved upon that by the use of two tubes pivoted in a frame. Now there are many fine instruments, tubular, combined tubes and mirrors, the most perfect of variable stereoscopes, with pictures illuminated and " moving," all calculated to attract the child. The lighting can be varied so as to dim the sight of the good eye and heighten the sight of the bad eye. There is every contrivance that can assist the eyes to receive impressions and convey them to the brain. Practice with these instruments is directed first to getting the child to see the two images simultaneously, and that attained, to the more difficult task of keeping these images in view, even when the angle of the setting of the instrument is reduced to less than that of the squint. When either of these steps is certainly attained a great advance on the road to recovery has been secured. The exact value of the orthoptic treatment has not yet been determined; too much has been claimed for it by some enthusiasts. Certain considerations show its limitations. First there is the physiological fact that the attempt to see diverse images with the two eyes is unnatural. The phenomenon known as the "struggle with the retinæ" demonstrates this. If in an appropriate instrument the normal-eyed be shown two crosses, say that of St. George to the right eye and that of St. Andrew to the left, for the moment the person will see these superposed to make a Union Jack, but then he will see a curious alternation of the images, one or other cross will fade out, so that he will see the cross of St. George and not that of St. Andrew, and not even the most devoted Scot can prevent the disappearance of his sacred symbol. Another and more material difficulty arises from the brevity of the effects obtained, at most the child will tolerate half an hour's practice a day, and if then there is the best result it is but a fraction of the day of the child during the rest of which the vicious effects of the suppression will persist. Theoretically Darwin's long nose was better calculated to control the eyes, but even that was not tolerated for long. At present the evidence is that orthoptic treatment to be of any use must be begun as soon as the child can be interested in pictures, to leave it until the age of six, seven or eight years of age makes it hopeless. It is not of any use in divergent squint or in alternating squints. It is most effective in cases of fixed convergent squint in which the vision of the squinting eye is at least 6/18, in fact in just those cases recognized as likely to respond favourably to any treatment. The method, however, is of real value in preparing the way for and assuring the success of the next stage of the treatment—operation.

Operation.—Three points come up for review: (1)

The rational basis of the procedure. (2) The best time for the undertaking. (3) The most reliable technique. The rational basis for operation depends on what is meant by the " cure of squint "; if this is no more than reduction of the deformity, the basis is no more than the objection of the parents or the child to the ugliness of squint and the risks of some adverse mental reaction. If we aim at a real cure, then we want to put the eyes into such a natural position as will assist the recovery of binocular vision. From this point of view, operation is not only reasonable, but necessary, even urgent. By operation we may do permanently what the orthoptic treatment can only do temporarily. There is no doubt that in fixed squint of some duration there is a change in the condition of the muscles. In convergence the internal rectus is shortened and thickened, and the externus stretched and thinned. These altered states are obstacles that cannot be overcome by training; there must be readjustment. The time of operation is also determined by what we wish to do. If we only want to correct the deformity there is no urgency, any convenient time will do. If we aim at restoration of binocular vision, then operation should be advised as soon as we are sure of certain conditions:—the effect of wearing glasses and the exercise of the squinting eye for six months; and some recognition of the two images presented to the eyes with any form of stereoscope. We may then adjust the tendons with good hope that the corrected position may be kept in order by a renewed brain control. Cases of alternating squint are in a class apart, in these there may be perfect eyes with full vision in each eye and no hint of any fusion faculty. In these children it is better to operate at the earliest convenient date. I have even operated on infants under one year old. Late operation in these cases may set up troublesome diplopia.

The technique of operation.—The number of operations devised for the correction of squint is legion. The first operation method was that of the "Chevalier" John Taylor, of Norwich.[5] He travelled through Europe "curing" squint by making a cut at the inner canthus of the eye and immediately covering the fixing eye. Some have doubted if a tenotomy was really done, but there is good contemporary evidence that he did put eyes straight. Tenotomy had serious drawbacks. Overdone it caused other deformities, a sunken caruncle, a bulging eye, and sometimes a divergent eye. Von Graefe introduced the advancement and shortening of tendons to pull the eye into position. Advancement with or without some form of tenotomy has held the field since then. The difficulty of the operation is evident when the mobility of the eye is considered, the slenderness of the muscles, and the uncertainty of the exact replacement of a severed tendon in its original axis on a curved surface. To get rid of these difficulties forms of shortening tendons without section and of lengthening without complete section have been devised. I have practised such a form of operation for several years with results that are proof of its adequacy.[6]

Conclusion.—Early treatment is essential to rea success, i.e. recovery of binocular vision. There is no room for a "wait and see" policy. If the doctor waits his patient will soon fail to see in the fashion he should.

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THE TREATMENT OF CONJUNCTIVITIS

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CONJUNCTIVITIS is a very protean condition. It may be seen in many different forms from the simple hyperæmia to the acute purulent form associated with the gonococcus. While the milder forms are common enough, acute manifestations of the disease are really not very common. At times epidemics of "pink eye" run through schools or barracks, though this form of conjunctivitis is not a very severe affair, usually lasting only a few days in each individual case. In the majority of all cases the clinical appearance is no clue to the infecting agent, and if the bacteriology is to be ascertained, a swab must be examined and a culture grown. Except in severe or intractable cases, a knowledge of the bacteriology, though probably desirable, is not absolutely essential. In this connection it may be mentioned that before an intra-ocular operation is undertaken, it is imperative that a conjunctival culture should be taken.

The symptoms of conjunctivitis vary directly with the severity of the attack. Certain general features are characteristic. The discomfort or pain is referred always to the site of the disease. There is grittiness, and a feeling of sand or a sense of burning under the lids. There is difficulty in keeping the lids open. There is some degree of photophobia though not usually so much as in the corneal affections. The lids are stuck together in the morning on waking to a greater or less extent. But there is no circum-orbital or temporal neuralgia, which is the characteristic iritic pain, nor is the globe particularly tender to the touch. On inspection, a certain amount of ptosis may be noticed, but this will not be particularly obvious if both eyes are equally affected. The vessels of the conjunctiva covering the globe (bulbar conjunctiva) will be engorged and prominent. The conjunctiva covering the lids (palpebral conjunctiva) will be injected and there will be a certain loss of lustre and of sharpness of outline. It will be noticed that the least injected area will be that immediately around the cornea. In affections of the cornea and iris, this area is always the most injected part, and in iritis cases there is in addition engorgement of the deeper vessels in the sclerotic, producing the homogeneous blue-red flush, called ciliary injection. This is not seen in a pure conjunctivitis. The secretion varies from a little dried crusting of the lashes with a few flakes of mucus floating in the fornices, to a profuse purulent discharge, which later is practically confined to severe cases of gonorrhœal conjunctivitis.

Complications and sequelæ are not common, except in very severe cases. Even in them, complete resolution is the rule. The greatest immediate danger is involvement of the cornea, leading possibly to ulceration, perforation, and intra-ocular infection. If the process stays at ulceration, which is usual, considerable damage to sight may ensue, owing to the opaque scarring of the cornea which results. Later sequelæ are deformities of the lids due to scarring of the conjunctiva. This, however, practically only occurs after long-standing inflammation due to trachoma, or after trauma or burns.

In the consideration of *treatment* of conjunctivitis regard must be paid to the value of the tears. Tears contain lysozyme, which is an anti-bacterial enzyme, and which is a very potent protection against any chance infection. This lysozyme content of the tears very rapidly becomes diluted, and so ineffective if there is much watering of the eyes. Excessive watering therefore is to be deplored, and anything which can control it should be used. Ridley advises the use of atropine or hyoscine in this connection on account of their local action in reducing the secretory activity of the lachrymal gland. In mild infections, nothing more is needed than bathing with warm boracic lotion, and the application of a little vaseline to the lid margin at night-time to prevent them sticking together in the morning. Other lotions which are useful in severe cases are boracic with zinc sulphate gr. ½–ii to the oz. (particularly in Morax-Axendeld infections); oxcyanide of mercury 1/8000 (in *Staphylococcus aureus* infection), and perchloride of mercury 1/10000. A drop of adrenaline 1/1000 will often give much temporary relief.

There is no doubt that the application of silver nitrate 2 per cent. is by far the best method of attack upon the inflamed conjunctiva. It should be applied to the everted lids by means of cotton wool, wrapped round a glass rod or match stick, which is previously dipped into the solution. It causes a superficial sloughing of the surface cells of the conjunctiva, and in consequence should not be used more often than once in the 24 hours. The process is very unpleasant for the patient, and a previous cocaine instillation does not relieve matters to any great extent. Various proprietary silver preparations (such as protargol 12–10 per cent. and argyrol 10–25 per cent.) are on the market, and can be instilled into the eyes in drop form once or twice a day. Such experimental work as has been done suggests that apart from silver nitrate, there is very little bactericidal action in these preparations. They do, however, seem to produce results. It may be mentioned that of late good results have been obtained by the use of ultra-violet rays, both in sterilizing the conjunctival sac preparatory to intra-ocular operations and in stimulating the defences locally to combat infections.

As a routine in all cases of apparent conjunctivitis the lachrymal passages should be investigated. Pressure over the lachrymal sac should be made, and the puncture watched for regurgitation of fluid tears, mucus or pus, and if in doubt the patency of the lachrymal passages should be demonstrated by syringing. There are certain manifestations of conjunctivitis which are characteristic either by reason of the clinical appearance or on account of their severity or intractability. In some cases, too, the clinical appearance will give clue to the bacteriology, and so to the treatment, if there is a specific one for the particular infecting organism.

Koch-Weeks conjunctivitis. — This is the typical "pink eye" of schools. It appears almost to be infectious, and will run through a school or institution. The infecting agent is the Koch-Weeks bacillus. In appearance this form of conjunctivitis is easily recognizable by the suffused appearance of the bulbar conjunctiva, and the frequent appearance of multiple small hæmorrhages in this situation. It is usually not very severe and can be likened in its course to the common cold in the head. There are two or three days of fairly acute photophobia, burning and watering of the eyes, and then the attack subsides, the whole lasting from a week to ten days. It must be stated, however, that at times a much more severe manifestation occurs, with some purulent discharge. No special treatment is needed. Warm boracic bathings every few hours during the height of the attack and some boracic ointment between the lids at night time to prevent the lids sticking; 5 per cent. protargol drops may be used in addition, in severe attacks.

Angular conjunctivitis.—This form of conjunctivitis is due to the Morax-Axenfeld bacillus. The naked-eye appearance is characteristic. The inner or outer corners of the eyes are red, and the appearance is perhaps more strikingly seen when the patient is a few yards off. The palpebral conjunctiva on inspection is found to be red and swollen, but usually the bulbar conjunctiva is relatively little affected. This affection is not usually very acute, but is apt to be chronic. Zinc sulphate is specific for the condition, and irrigations of gr. ½ to gr. i of zinc sulphate to the ounce of boracic lotion should be kept up regularly three or four times a day until the condition has entirely subsided, as otherwise minor relapses are likely to occur.

Membranous conjunctivitis.—Here the surface of the conjunctiva is covered by a membrane which peels off without much bleeding. Though usually due to the diphtheria bacillus, other organisms can produce it, notably the streptococcus, and bacteriological examination is necessary to establish the diagnosis. True diphtheritic conjunctivitis is probably rather more frequent than has been thought to be the case hitherto, but fortunately post-diphtheritic paralysis after a conjunctival infection is not common. Mild and severe forms occur, and there is always danger to the cornea and in severe cases, in addition, permanent scarring of the lids may occur. It is usually seen in children under ten years of age, and only very rarely in adults. As regards treatment, the administration of antitoxin is the first requisite, and locally to the eye frequent irrigation and hot bathings. Atropine drops should be instilled to help in safeguarding the cornea.

Gonococcal conjunctivitis.—This is by far the most severe form of conjunctivitis. It occurs in two forms: (1) In the new-born (ophthalmia neonatorum); (2) in adults (purulent conjunctivitis). *Ophthalmia neonatorum* is responsible for a very large number of cases of blindness, and in consequence a very wide definition has been laid down by the public health authorities. Clinically it is the severe form of purulent conjunctivitis occurring within a few days of birth which is meant by this term. Not all of the cases are actually due to the gonococcus. The streptococcus is responsible for a small proportion, but it is computed that at least 70 per cent. are gonorrhœal, the eyes being infected during birth. Occasionally the infection may take place subsequently from contact with discharge on towels. The onset is usually on the second or third day. The eyelids become red and swollen. At first there is a thin sanguineous discharge, but this rapidly becomes purulent. When fully developed the lids are distended and plum red in colour. Pus pours out from beneath the lashes. On separating the lids, pus may be shot out owing to the pressure with which it is contained under the lids, so care must be taken by the examiner. The palpebral conjunctiva is found to be greatly swollen, so that it is very hard to get a view of the cornea. This is the time when the cornea may become involved. The disease remains at its height for about a week, and then begins to subside, and complete recovery will take place in from three to four weeks. If the cornea has survived, there will be complete recovery without resulting scarring, or, in fact, any sign of what the eye has been through. If the cornea has been ulcerated, there will be an opaque scar proportionate to the ulceration, and if the ulcer has perforated, the interior of the globe may be affected from involvement of the iris with the corneal scar, to complete disorganization of the eyeball. Prophylaxis has reduced the incidence of ophthalmia neonatorum to a very considerable extent, and is of the utmost importance. It consists in cleaning the eyes immediately after birth, and instilling a drop of 1 per cent. silver nitrate between the lids.

Treatment : Frequent, almost constant irrigation is the most important item of treatment, and it may be necessary to divide the external canthus in order to carry this out efficiently. The nature of the fluid used is not of so much importance. The routine treatment used at the special Hospital for Ophthalmia Neonatorum, St. Margaret's, Kentish Town, is irrigation with a solution of eusol (1 in 7) hourly, and after each irrigation, the instillation of one drop of a solution of acriflorine 1/1500 in castor oil. Atropine sulphate ½ per cent. is dropped into the eye as soon as any haziness of the cornea is noticed. If one eye only is affected, the greatest care must be taken to prevent spread of infection to the other eye, which should be covered with a Bullar's shield.

Purulent conjunctivitis is usually caused by infection carried direct from the urethra. It follows a course very similar to that of ophthalmia neonatorum in the infant. But unfortunately the cornea becomes infected in a much higher proportion of cases. *Treatment* is on similar lines. Hourly irrigations, atropine if signs of corneal haziness, and protection of the unaffected eye if only one is affected. Application of silver nitrate 2 per cent. once in the 24 hours is advisable.

Follicular conjunctivitis.—This occurs very commonly in young children. Both eyes are usually affected. Numerous follicles are seen in the lower and upper fornices, and also in the palpebral conjunctiva of both lower and upper lids. The follicles are always more numerous in the lower than in the upper lids. They are situated in parallel rows, and are most frequent in the central portion of the above named areas, being usually absent at the canthi. The symptoms are very slight, and, in fact, may be absent. In any case, not more than a little irritation and watering. *Treatment :* The less treatment the better. The chief difficulty is to reassure the parents that the condition is not serious, and will eventually pass away. In fact, the application of antiseptics to a normal child's conjunctiva can produce follicles. Bathing with boracic lotion and the instillation of boracic ointment is all that is necessary. It will be well, perhaps, to estimate the refraction, and see that the child's general health and surroundings are satisfactory.

Phlyctenular conjunctivitis.—This is a disease of childhood. The typical appearance of this disease consists of the presence of one or two small round grey or yellow nodules (phlyctenules) situated at the junction of the conjunctiva and cornea, but just on the conjunctiva. There is usually a leash of vessels around each nodule, and small local congestion. Occasionally an ulcerative process spreads on to the cornea, and tracks across it from the original site, drawing a leash of vessels after it. This process may spread right across the cornea. This corneal involvement is not, however, the rule, but an infrequent complication. Occasionally also, a single large phlyctenule is seen protracted further out of the bulbar conjunctiva. There is generally a great deal of discomfort and photophobia associated with the presence of phlyctenules, and the child makes matters worse by rubbing its eye, and setting up an excoriated condition of the skin of the eyelids. At times, however, phlyctenules are surprisingly well borne and symptomless, though this is unusual.

Phlyctenular disease was at one time thought to be a tuberculous manifestation, but this is definitely not the case. It is a disease due to bad hygienic conditions, and chiefly seen in the hospital class, only very rarely seen among the children of the well-to-do. Malnutrition, especially overmuch carbohydrates and too little fat in the diet, is a factor. Septic tonsils and adenoids are also a factor. If the child can be sent away to a convalescent home by the sea the conditions soon clear up, only to recur on return home. Recurrences and relapses are frequent. Local treatment consists in the instillation of atropine, which gives rapid and considerable relief, and boracic bathings. Cod-liver oil, ultra-violet light therapy and vitamin D preparations are very valuable. The essential factor is improvement in the home conditions.

Trachoma.—This is a contagious disease of the conjunctiva of considerable severity and great chronicity. Once the infection is established it is likely to be years before the process ceases and there may be frequent relapses. There is sure to be considerable scarring of the conjunctiva as a result, and in bad cases this scarring may be sufficient to cause deformities of the lids, such as ingrowing eyelashes and entropion. As in most cases the cornea is also involved, the resulting scarring will cause interference with vision. Fortunately it is a disease very rarely seen as a fresh infection in this country nowadays. At the beginning of this century energetic measures were taken to control the disease, and trachoma schools were set up. In these continuous treatment could be applied to the children affected, and at the same time they were kept segregated and their education could be carried on. As the disease most frequently starts in children, this measure in time gained control of the disease, and now the trachoma schools have largely been disbanded. Though the disease most commonly starts in children, adults can quite readily be infected. It is interesting to note in this connection, however, that there were no cases of fresh infection among the white troops in the Mesopotamia campaign of the Great War. Though such measures as the trachoma schools were the most important individual method in this country of getting control of the disease, yet the incidence of trachoma is mainly dependent upon overcrowding, and dusty and insanitary housing conditions as instanced by the tropics being the areas where trachoma is most particularly rife. The Nile Valley has always had a particularly bad reputation for this disease.

No micro-organism has been satisfactorily connected with this disease, though it is probable that such a cause is really present, and will some day be discovered. In the early days the disease appears either as a papillary hypertrophy followed by the appearance of follicles, or at times the follicles are the first manifestations. They are seen in most amount in the upper fornix, and on the under surface of the upper lid;

they are present to a less extent in the lower fornix. When the follicles are well developed the upper half of the cornea is invaded by vessels—pannus—the vessels are running superficially, and with a tendency to superficial ulceration of the cornea. During the course of the disease the follicles rupture and cicatrization follows. This is a very gradual and prolonged process, as new follicles appear as the old ones go. The consequence is that there is a steady process of cicatrization going on all the time the disease lasts.

Treatment in the early stages consists in daily paintings of the lids with silver nitrate, or with tincture of iodine and with boracic irrigations. If there is any corneal ulceration, atropine should be instilled. Later, when the condition has passed its zenith, and all corneal ulceration has subsided, solid copper sulphate stick should be applied to the lids. In very severe cases expression of the follicles in the fornices may be done with roller forceps. Excision of the tarsal plate is advocated very strongly by some, in the chronic period, partly to get rid of the process, as it is held that the tarsal plate itself becomes infected, and also to prevent subsequent deformities of the lids which depend largely upon contraction of the tarsal plate.

Spring catarrh.—This is a not very common condition. It is seen in young adolescents, and is only in its active phase during the spring and summer months. At that time there is a marked photophobia, lachrymation and irritability of the eyes. On everting the lids, the under surface of the upper lid will be seen to be covered with large, hard, flattened papillæ. These papillæ are composed of fibrous tissue. In the papillæ and in the conjunctival secretion there are large numbers of eosinophiles. Occasionally around the limbus raised semi-translucent masses are seen. During the winter months the symptoms abate, though the naked-eye appearance of the conjunctiva does not materially alter. The cause of the condition is not know. Hay fever and asthma are very commonly associated. Treatment is not satisfactory. Radium application has in some cases apparently done good. Adrenaline drops give relief. Fibrolysin to the conjunctiva surface may help. General constitutional treatment is important. Probably there is nothing effective to be done but to attempt to give relief, knowing that the condition will get better as the summer passes, and further that as the sufferer gets older, the disease will gradually leave him.

Tuberculous conjunctivitis.—This is not common. It is usually seen as cock's comb excrescences which grow from the fornices, or large ulcers surrounded by granulations. The prognosis is good. The disease areas should be removed, if possible, or thoroughly attacked by the cautery. Tuberculin is useful.

Parinaud's conjunctivitis.—Acute conjunctival manifestation often with a local ulcer formation on the palpebral conjunctiva. There is often a rise in temperature, and the pre-auricular gland is enlarged and tender. Many of the cases are tuberculous. No particular treatment is necessary. Hot bathings, and occasional application of silver nitrate. The disease may last several weeks before settling down.

Syphilitic conjunctivitis.—This is very rare. Chancres and gummas occur. In appearance both rather suggest an internal stye. Often the diagnosis is not made at once as it is not thought of, but the protracted course of the condition suggests its etiology.

Vaccinia.—This again is likely to be missed if not thought of. A pustule forms at the lid margin, and the pre-auricular gland is enlarged. There is much conjunctival œdema. Boracic bathings are all that is necessary.

THE CAUSATION AND OPERATIVE TREATMENT OF DETACHMENT OF THE RETINA

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THE amount of literature on this subject published in the last few years makes it extremely difficult to condense all that is important in a short article.

CAUSATION OF DETACHED RETINA

The causes may be divided into (i) those connected with disease, and (ii) those coming under the heading of traumatic and idiopathic detachments. Though this article will deal chiefly with the operative treatment of the latter class, it is important to enumerate the various diseases associated with detachment, as it is now becoming clear that the operative treatment of detachments is often successful, especially in recent cases. The tendency will be to think that *all* cases can be operated on, whereas, with a little care as regards the history of the case, and better still, the careful examination of the fundus, the medical man will realize that some cases will ultimately be cured when the disease is treated or has abated, and that an operation will not be necessary.

Diseases causing detachment of the retina.—Tumours of the choroid, retinitis proliferans, albuminuric retinitis especially associated with pregnancy, choroiditis, especially metastatic, e.g. a choroiditis secondary to antral suppuration. Detachment has also been known to occur from *Cysticercus cellulosæ*, and other entozoa, echinococcus, filaria, and larvæ of diptera. Other causes are exudation into the choroid, as occurs in purulent choroiditis, hæmorrhage from choroidal vessels, and scars remaining after perforating injuries in the region of the sclera.

Detachments due to trauma and of the so-called idiopathic type.—The various *theories* explaining the cause of these detachments are numerous, the principal being : (1) that detachment is caused by retro-retinal exudation; (2) that a vitreous drag occurs from the shrinking of an exudate previously excreted by the ciliary body; (3) that the shrinking of an otherwise transparent vitreous body, the result of choroiditis, causes the development of a detachment by the formation of an adhesion between the vitreous and the retina in the anterior part of the eye, thus tearing away the retina and causing a hole through which the generally abnormally fluid vitreous enters in myopia; the vitreous is often excessively fluid, and patches of choroiditis are common; this accounts for the frequency of detachment in myopia.

No doubt detachments are also caused by holes occurring in a diseased retina or due to cysts, of a degenerative type, breaking down. On the other hand, it is well known that holes can be found without any detachment at the same time. Tears occur in so many cases that it seems best, if *not* absolutely correct, to take the view that detachments *are* due to tears of the retina.

Trauma.—Trauma acts in many ways, occurring from definite blows or sudden jerks; often the most insignificant accidents may cause a severe detachment in an eye with degenerative changes. If one goes carefully into the history of an eye which otherwise appears quite healthy, one may find a history of trauma years previously. Many authorities say that the increase of detachments, especially in young people, is due to the large amount of games played and to the great increase in motoring accidents.

The finding of the holes necessitates great patience, and often one has to spend many hours, in all, before the hole is found. With the aid of the electrical ophthalmoscope, the search is greatly facilitated. It is most important to examine the patient in a prone and sitting-up position and, if necessary, the patient may be allowed to get up and move about. This may alter the position of the detachment and lead to the detection of a tear not previously seen.

The various tears fall into the following groups:— 1. Round tears, occurring in the upper and outer temporal quadrants. 2. Horse-shoe and crescent tears, occurring in the upper and inner quadrants, of the globe. 3. The so-called disinsertion of Gonin occurs mostly below and may be bilateral. These tears are especially associated with traumatism. 4. Small, very fine holes associated with areas of degenerated retina; these holes have been especially described by Vogt. If the tear is carefully examined, it is often possible to see the torn lid of the hole either flapping in the fluid vitreous or lying loose in the neighbourhood of the tear.

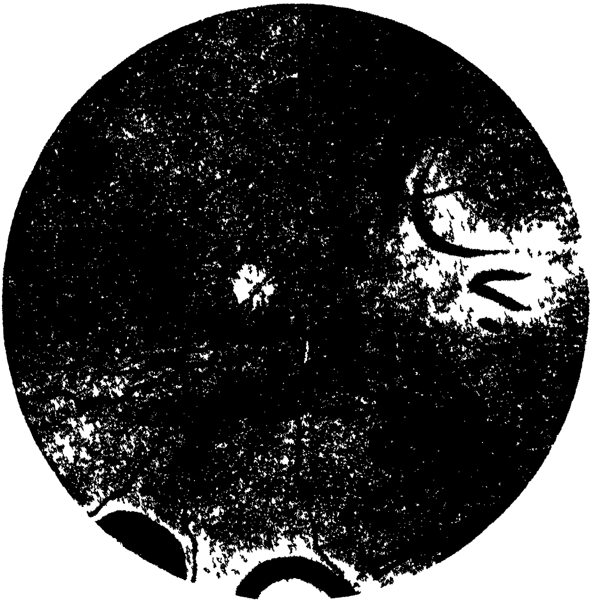

FIG. 1.—The various tears occurring in detached retina. the large, crescentic tear, horse-shoe and round tear. In the lower part of the figure are two so-called "disinsertions," i.e. the retina is torn away in the region of the ora serrata.

OPERATIVE TREATMENT

In describing the operative treatment of detached retina, especial mention should be made of the wonderful work done by Professor Jules Gonin, of Lausanne; as his technique is so intimately connected with all subsequent operative procedure, a detailed account of his method will first be given. The various stages are as follows :—

(1) A very careful, detailed *history of the case* is taken, in regard to any recent injuries or past accidents, whether the patient has noticed flashes of light or coloured lights, small floating bodies or cloudy or wavy occurrences in the eye. Many of these symptoms are due to sudden disturbances of the vitreous body or disturbances of the circulation in diseased or degenerated portions of the retina. If the detachment involves the macula, complaints of metamorphopsia are made; the patient may also say the "part of the field" over the defect was first noticed on seeing half an object, such as a tree, or part of the pen only when writing, or having to tilt the head, e.g. to see the moon. All these points help and may be of great use in deciding where the detachment originated. The central vision should be taken, also reading noted. The fields should be taken carefully, the slit-lamp used, and a note made of the tension; also of any past eye trouble, especially of an inflammatory nature.

(2) *Searching for and localizing the tear.*—A wide pupil is very necessary. This can be produced by instilling homatropine or cocaine; if necessary, leavoglaucosan, a powerful dilator, can be used. It is most important to make a careful sketch of the fundus, noting any inflammatory or pigmented spots and the extent of the detachment. The search should be carried out by working across the diameters of the eye and by noting the size and shape of the detachment. When the tear is found, the diameter of a clock face in which the tear lies is noted, also its shape and measurement taken in disc diameters. A disc diameter = 1½ mm. The distance of the tear from the ora

serrata is measured; the ora serrata is generally 8 mm. from the limbus, less (7 mm.) on the temporal side, and in myopia often 9 mm., but 8 mm. is a good average measurement. When searching the periphery, the neighbourhood of the ora serrata can be shown more plainly by pressing on the region outside the eye with a probe. As stated above, it is most important to measure the width of each tear, the distance, of the most posterior part, from the ora and also of the proximal part, or that nearest to the ora serrata.

(3) When the position of the tear has been found, it must be transferred to the surface of the eye. After a drop of pantocaine ($\frac{1}{2}$ per cent.) has been instilled in the eye, a mark is made on the limbus corresponding to the diameter found. The first mark is made with gentian violet or methylene blue; if this spot corresponds with the position of the tear on the diameter chosen, the spot is marked with Indian ink. One can then mark the opposite limbus as well, or this can be done with a silk guiding suture at the time of

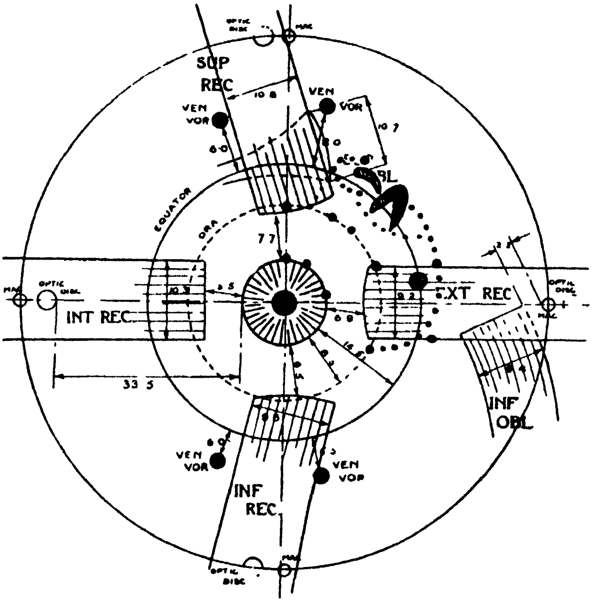

FIG. 2.—A muscle chart for mapping out the tears before the operation for cure of detached retina; three tears are shown and position of the marks on the ora and the micro-punctures to be made.

the operation. Having marked these two spots, the distance from the limbus is marked at the operation.

The operation.—Pantocaine, ½ per cent. (this is the least likely of all local anæsthetics to injure the cornea), is instilled several times; a sub-conjunctival or sub-tenon injection is then given of novocaine, 2 per cent., and adrenaline; after waiting ten minutes, the conjunctiva is incised about 14 mm. from the limbus, the sclerotic laid bare and all hæmorrhage stopped; sutures are placed in the conjunctiva and the mark of the tear made on the sclerotic. A small incision is made with a Graefe and a white-hot Paquelin cautery is plunged through the sclerotic, choroid, and retina into the vitreous, to a depth of 4·5 mm. The conjunctiva is immediately closed and the two eyes bandaged, after instilling guttæ atropinæ, 1 per cent., and guttæ argyrol, 25 per cent. The patient is put back to bed with the head resting in such a way that the vitreous presses on the position of the tear. On the fourth day, the eye is dressed, atropine 1 per cent., being instilled. Then the eye is dressed every day or every other day. On the seventh day, a detailed examination is made, and if the retina is back, the patient is allowed to get up on the fourteenth day. This procedure gave many wonderful results, especially in the hands of Gonin, but many accidents occurred, no doubt due to not using proper cauteries, or the wrong heat. Further, the marking out of the tear is tedious. Hæmorrhages occur and traction folds from the scars made by the cautery. It is practically impossible to make more than one puncture, except by using a fine galvano-cautery, suggested by Sourdille, which enables three punctures to be made before the globe becomes soft. For this reason many new operations have been tried, especially with a view to causing retino-choroidal adhesions.

Lindner-Guist operation.—This operation is carried out by means of caustic potash sticks. Many trephine holes, 1·75 mm. in diameter, are made round the localized tear; the choroid is exposed and each spot touched with the caustic stick; any excess is neutralized with sodium chloride solution. In about one in three of the trephine holes, the choroid is gently pierced with a conical probe to let out the sub-retinal fluid. The conjunctiva is then sewn up and the subsequent treatment is the same as in Gonin's operation. This method causes little areas of choroiditis which bring about adhesions to the retina. Though the method is ingenious and successful, it is very lengthy to do; it also weakens the sclerotic and causes inflammatory complications. Rubbrecht, of Bruges, used jequiritol to cause an adhesive choroiditis, and the laborious work of Sourdille should also be mentioned; he caused adhesive retino-choroiditis by using mercuric cyanide, which percolated through punctures, made in the sclerotic, and which passed through the choroid retina into the vitreous. Lately, two new methods have been evolved by Lindner, of Vienna, especially for holes in the region of the macula and also for eyes which, due to previous operation, cannot be helped by any of the methods already described. He makes trephinings in the sclerotic, tunnels between the choroid and sclerotic and reaches the region of the hole; he then injects an infinitesimal quantity (0·01 c.cm., 6 per cent.) of potassium hydroxide with a special cannula. He calls this his sub-choroidal cauterization undermining method. It is amazing that, according to Professor Lindner's paper, practically no harm arises from this method, and some wonderful results are claimed. His other method is to lessen the spreading of the detached retina by removing oblong strips of the sclera; this is done at two sittings. Care has to be taken to get the incisions parallel and he does this by using a compass attached to his special knife; the stitches must pass between the inner and outer surfaces of the sclera.

Operation by means of diathermy.—With the employment of diathermy great advances have been made, as there is no doubt that by using a diathermy current less harm is done to the eye than with any other method previously described, and complications are practically unknown. The principal surgeons whose names are associated with this method are Weve, of Utrecht; Larsson, of Oslo; Safar, of Vienna; Genet, of Lyons; Jenson, of Jena; and Coppez, of Brussels. The first descriptions of operations by diathermy were published by Weve in May, 1930, and his first cases shown at the Dutch Ophthalmological Society in June, 1930. At the same time, Larsson was working on the same lines and published his results somewhat later in a Swedish ophthalmological paper. Both these surgeons used a ball electrode for surface coagulation, the fundamental difference being that Weve followed the teaching of Gonin in marking out the tears most carefully, whereas Larsson's treatment ignored the tear and aimed at causing retinal choroidal adhesions, irrespective of the position of the tear. Later on, he said it would be beneficial to coagulate the surface in the neighbourhood of the tear if one were present. Weve, in a later paper, described his method of using a diathermic needle; at first he did not keep to the short needle, but latterly he has used shorter needles and aimed at the same results as Safar, of Vienna, who, by using short needles, did not cause any injury to the retina. Weve also employs a diagnostic puncture, using needles of different lengths, depending on the depth of the detachment. After the puncture is made, he examines the case with great care by the indirect method of ophthalmoscopy. He combines widely the surface and micro-puncture methods, whereas Safar and the Viennese school use only the multiple micro-puncture method.

As the surface coagulation and multiple puncture methods are those which are the most extensively used, I propose to describe them more in detail, especially the micro-puncture method of Safar, which has been used exclusively at the Western Ophthalmic Hospital in the past year.

The surface coagulation method of Weve and Larsson.—The sclera is laid bare and cleared as much as possible of all connective tissue; bleeding spots and oozing are stopped by using little swabs of stryphnon gauze or coagulating the bleeding point with a heated (but not red hot) probe. The sclerotic is kept dry, except when an extensive cauterization is done; then saline is dropped on the site to stop charring. At Moorfields, it has been found beneficial to keep the scleral surface moist the whole time. Weve uses a ball of some millimetres in diameter, using a current of 150 m.a. He holds the ball against the sclerotic until there is slight discolouration and slight drawing up of the superficial fibres of the sclerotic. This takes 1 to 2 seconds; if a ball-point electrode is used, 0·65 mm. in circumference, it has to be held in contact for 5 to 8 seconds. When the surface coagulation is finished, the fluid in the sub-retinal space is let out in various ways—by micro-punctures, with a fine diathermy needle or a large one if there is a large quantity of fluid, by a trephining of the sclera and perforation of the choroid with a fine-pointed probe or by igni-puncture, very gently and carefully burning a small opening through the sclerotic and choroid till the sub-retinal fluid appears.

On examining the fundus after these applications, a white, cloudy appearance is seen at the site of the coagulations. This persists for 14 days or more and then gradually clears up, leaving discreet areas of fine pigmentation in the choroidal layer. This appearance is graphically shown in an admirable article by Mr. Shapland in the *Transactions of the Ophthalmological Society*, 1933.

The micro-puncture operation of Weve and Safar.—The following description is based on the technique which is used at the Western Ophthalmic Hospital. When the diagnosis of detachment of the retina is made, a very careful history is taken, as described in the details of Gonin's operation. The patient is given Lochbrille spectacles to wear. These spectacles designed by Lindner have side pieces and a central opening 5 mm. in diameter in the middle of an opaque piece of black celluloid; they tend to prevent extension of the detachment when the patient cannot be admitted at once. On admission a detailed drawing of the patient's fundus is made, with details of the tear and any special appearance in the fundus. Special coloured cards have been designed by Messrs. Keeler, of Wigmore Street. When the drawing has been made, the various tears are drawn on a muscle chart which greatly facilitates the accurate carrying out of

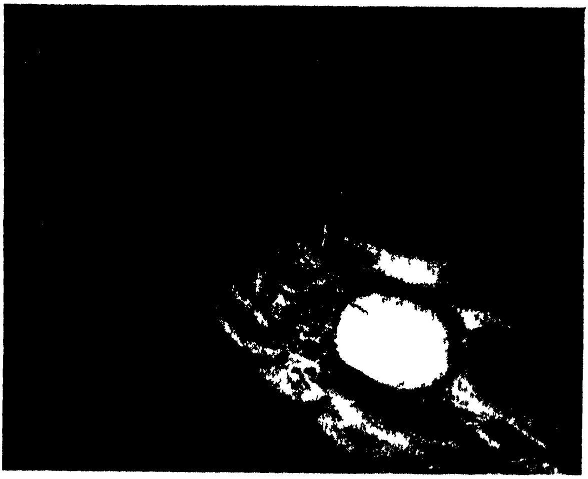

FIG. 3.—A typical scar after a successful Gonin operation; the scar is 3–4 mm. in breadth and completely destroys the structure of the retina from fibrosis.

the operation. Marks are made on the chart to show the position of the ora. The exact extent of the field where the punctures are to be made is marked, as is also the depth of the detachment; this helps as regards the length of the needles used.

On the day of the operation, half an hour before it, an ampoule (2 c.cm.) of cibalgin is given; this quietens the patient in a very marked way, without any untoward effects, such as may follow morphine or its derivatives. At the same time, a suppository of nautisan is given; this acts an hour later on the vomiting centre and stops reflex vomiting. The conjunctiva is anæsthetized by pantocaine, ½ per cent., which causes very little, if any, corneal softening; a contact glass can be used, but in many cases this is not necessary, as in addition to the pantocaine, saline can be dropped on the cornea during the operation. A traction stitch is put deeply in the sclerotic opposite the main point of operation. If a marking guide is used, this passes through the guiding suture. The conjunctiva is now picked up; sub-conjunctival and sub-tenonal injections are given, 2 c.cm. of novocaine, 2 per cent., and adrenaline (one drop to each c.cm.), special care being taken to inject the solution along the muscles. After 10 minutes the operation is begun. A generous incision is made about 8 mm.–14 mm. from the limbus, through the conjunctiva and capsule of tenon. The sclera is laid bare where the punctures are to be made; the muscles are defined. The ora is then marked out by three or four spots, according to the case; if a small tear is present, this is marked out by a guiding suture, as in Gonin's technique. If no tear is present, a barrage is made, either with a 1½ mm. Weve needle or a Weve's ball electrode, 14–15 mm. from the limbus. A fine stippling is done in some cases with a 1 mm. Weve needle. The current used for a single needle is 30–50 m.a., for the ball electrode, 100–150 m.a. The fundus is then examined to see the result of the cauterization and more is done if necessary.

The conjunctiva is then sutured and a drop of argyrol 25 per cent., and atropine sulphate 1 per cent., is instilled. Both eyes are bandaged and a shield placed over the operated eye. The patient is taken back to bed and the head so placed that the vitreous presses against the situation of the tear. The eye is dressed on the fourth day; a short examination of the field of vision is made. The eye is dressed daily and a careful examination made on the seventh or eighth day. Lochbrille glasses are used on the fourteenth day and the patient gets up on the twenty-first day. If a second operation is needed, it is not generally done for a month, though it can be performed after 14 days. If the first operation has not been successful, it is important to sketch the tears and position of scars before the retina becomes detached again. In some cases, great improvement takes place, even though the operation was not a complete success at the time the patient left the hospital.

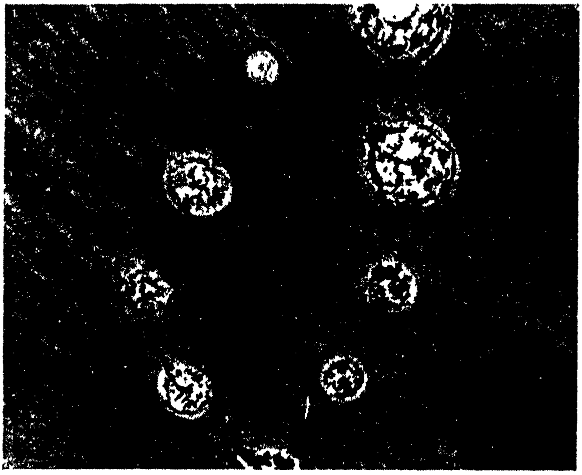

FIG. 4.—The result of a successful micro-puncture operation; the areas of choroiditis are deep to the retina, which is *not* damaged. In many cases, retinal vessels are seen passing over the areas of coagulation. The white spot above and to the left was made at a previous operation with carbolic; this scar involves the retina.

Apparatus and instruments needed for the operation described can be obtained from Messrs. Weiss, of Oxford Street, London, W.1.

GLAUCOMA

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GLAUCOMA is the term applied to a complex group of ocular conditions the distinctive feature of which is a rise of intra-ocular pressure. For clinical convenience glaucoma is classified as primary and secondary, and either of these groups may culminate in acute congestive manifestations or progress in an insidious chronic state from the initial symptoms and signs to the final stages of absolute blindness and pain. An intermediate stage between the acute and chronic states is described by some authors as "sub-acute," but as such is within the fluctuating bounds of this disease it seems to me that this does not merit a separate label of classification.

PATHOLOGY

In a limited space it is impossible to touch upon the fringe of the complex etiological problems of glaucoma other than briefly. A mass of experimental and clinical work has been done in attempts to elucidate the cause of primary glaucoma, and although many valuable contributions to this subject have been made the truth still evades us. Elliot described the filtration angle as the "cockpit" of glaucoma and the cupped optic disc as its "graveyard." An appreciation of the structure and function of the tissues in the vicinity of the filtration angle is essential to an understanding of many of the features of glaucoma. The balance between the production and drainage of the intra-ocular fluid, the part played by the intra-ocular blood pressure and blood volume, the distensibility and compressibility of the ocular tunics, the physical states of the vitreous and lens, the hydrodynamics of moving intra-ocular fluids, the effects upon the ocular contents of certain abnormal chemical constituents in the blood, toxins, hormones and the interaction of the sympathetic nervous system are among some of the important problems concerned in the solution of the cause of glaucoma. Controversy persists about the manner in which the intra-ocular fluid is formed and drained from the eye. Probably it is produced by a process of filtration through the capillaries of the ciliary body and secretion through the ciliary epithelium; the fluid destined for the anterior chamber is believed to be formed from the pars plicata of the ciliary body and that which passes into the vitreous from the pars plana. The fluid circulates forwards behind the iris, through the pupil and into the anterior chamber and also some passes posteriorly into the vitreous. Drainage is probably effected in the filtration angle by a combination of suction by the backward and inward displacement of the scleral spur on contraction of the longitudinal and circular fibres of the ciliary muscle and by the osmotic pressure exerted in the canal of Schlemm, which is in intimate communication with a deep scleral plexus of veins. Relaxation of the ciliary muscle allows the scleral spur to move forwards and outwards again and the ligamentum pectinatum by its elastic recoil to become approximated to the filtration angle. It is probable that some drainage takes place along the peri-vascular lymphatic sheaths of the central retinal vessels at the optic disc. Aqueous fluid entering the open anterior crypts of the iris is drained along the peri-vascular lymphatics of the iris stroma.

The essential cause of an increase of intra-ocular pressure is obstruction to drainage at the filtration angle. In acute congestive glaucoma this is effected by œdema and turgidity of the ciliary body and engorgement of the iris, in chronic glaucoma by the swelling of the vitreous or the lens pressing forward the iris root. and ultimately causing this to adhere to the posterior surface of the periphery of the cornea. The production of a vascular *crisis leading to engorgement* of the capillaries of the uveal tract will initiate a rise of intra-ocular pressure. Such a state of affairs has been produced experimentally by Duke-Elder, who, by raising the intra-ocular pressure above that in the ophthalmic artery for a variable duration, found that within 30 seconds of releasing the pressure there was vaso-dilatation of the iris vessels, increased permeability of the capillaries and a histamine-like substance in the aqueous. By stroking the iris with an intra-ocular cannula similar events accompanied by a rise of intra-ocular tension were observed. Duke-Elder explains the acute vascular crisis, increased permeability of the intra-ocular vessels and destructive rise of intra-ocular pressure as due to the liberation of histamine and the dissemination of its influence over the uveal tract by a system of axon reflexes. The instillation of histamine into the conjunctival sac of a cat will cause a rise of intra-ocular pressure and a vaso-toxic substance has been obtained from the aqueous in acute glaucoma and is probably related to histamine. Some cases of glaucoma are comparable to an œdema of the uveal tract. Maynard reported 20 cases of glaucoma in epidemic dropsy in Calcutta.

Anatomical factors disposing to glaucoma are a small globe, rigidity increasing with age, prolongation of the ciliary processes allowing the lens to move forward, increase in size of the lens which continues to grow after the rest of the eye has ceased to enlarge, and sclerosis of the ligamentum pectinatum. Hereditary and familial predisposition plays a part in some cases. Infantile glaucoma (buphthalmos) is due to defective development of the filtration angle and its structures. There is a faulty line of iris cleavage and the canal of Schlemm may be absent.

These are by no means all the facts implicated in the etiology of glaucoma. In the early stages of the disease it is impossible to detect any histological changes by any methods at our disposal to date. The material available for examination is mainly eyes badly damaged by long-standing disease. In the earlier stages the iris root is applied to the posterior aspect of the periphery of the cornea, but can be separated from it. Aqueous is absorbed through the iris crypts and from the stroma passes through the ligamentum pectinatum into the canal of Schlemm. Later adhesions occur, but drainage is still effected along the iris stroma. Finally, the iris becomes adherent, atrophic, bunched up with a semi-dilated pupil and no absorption takes place through the crypts. Ectropion uveæ and the formation of new vessels on the anterior surface of the iris follow. Atrophic changes also occur in the ciliary body, the ciliary processes becoming drawn out and hyaline deposits occurring in the sub-epithelial connective tissue. The choroid is flattened and atrophic and there is perivascular lymphocytic infiltration around the venæ vorticosæ and proliferation of the living endothelium. Degenerative changes occur in the nerve fibre and ganglion cell layers of the retina, and the lamina cribrosa becomes displaced backwards, producing cupping of the optic disc. Through lack of adequate nutrition the lens becomes opaque and finally the eye is blind and painful.

Secondary glaucoma is an event in a number of intra-ocular diseases. Some of the more important of these are inflammation of the anterior part of the uveal tract, traumatic cataract, dislocation of the lens, intraocular hæmorrhages and neoplasms, certain post-traumatic and post-operative states, in fact, any pathological condition which impedes the drainage of the intra-ocular fluid from the filtration angle by mechanically blocking it.

CLINICAL FEATURES AND DIAGNOSIS

Symptoms.—The necessity for the early recognition of glaucoma is paramount, and like other surgical emergencies, it should be ever in the forefront of the practitioner's mind. Tragedy and disaster follow in the wake of a missed diagnosis. The greatest care and patience must be expended in eliciting the history, and often this is indefinite and vague. Any person in the fifth, sixth and seventh decades of life complaining of neuralgic pain in the eye or its vicinity requires the most conscientious investigation of his symptoms and physical signs. In a typical case the pain is neuralgic in type; it is felt in the affected eye, the frontal, temporal and malar regions, and may radiate to the vertex; its onset is generally in the early morning after rising, passing off in a few hours as the patient moves about, and returning later in the day towards evening when he is fatigued, to be eventually relieved by sleep. The severity of the pain varies from a mild headache to the agonizing pain which prostrates the victim of an acute attack of glaucoma and causes him to vomit, become collapsed and have an irregular pulse. During an attack of pain the vision is impaired owing to corneal œdema, objects appearing "misty," "steamy," or "foggy." For the same reason lights are surrounded by "rainbow rings" or "haloes." Occasionally "blue flashes" are noticed during a rise of intra-ocular pressure. The character of some sufferers becomes appreciably changed, they show irritability of temper, are depressed, introspective and difficult to reason with. I have known a man's temper and disposition agreeably reversed after a trephine operation.

Signs.—The incidence is slightly higher in women than in men, and the former are more liable to an attack of acute congestive glaucoma than the latter. Jews, Egyptians and certain races of Negroes are more prone to this disease than other nations. Glaucoma is prevalent in India. In some instances a familial predisposition to glaucoma is of a simple dominant character, continuous in descent and transmitted by both sexes. Rossi, working on anthropological measurements, states that the glaucoma patient corresponds nearly to the brachycephalic Alpine race. The disease is more prevalent in persons with small corneæ and small globes, such as hypermetropes, but the myope is by no means immune. In primary glaucoma the anterior chamber is shallow and the periphery of the iris is approximated to the posterior aspect of the cornea, narrowing and partly occluding the filtration angle. In the early stages of the disease the pupil is round and active and the iris crypts and stroma normal. In acute congestive glaucoma the pupil is semi-dilated, oval and inactive owing to the compression of ciliary nerves by the increased intra-ocular pressure and to the vascular engorgement and œdematous condition of the iris and ciliary body. In the late stages of chronic glaucoma the pars iridica retinæ is drawn round the pupil on to the anterior surface of the iris, forming a chocolate-brown ring with an irregular outer border, so-called ectropion uveæ. The iris stroma becomes atrophic and flattened, and new vessels appear on its anterior surface.

When the intra-ocular pressure is raised the cornea becomes hazy from œdema of the epithelium and the substantia propria. In the higher degrees of pressure small vesicles form in the corneal epithelium and may rupture. The cornea in an acute attack of glaucoma has the appearance of ground glass, is dull and lustreless. Associated with this there is marked congestion of the conjunctival and ciliary vessels in the vicinity of the corneo-scleral junction, the lids are œdematous, the globe is tender and feels stony hard on palpation. The intra-ocular pressure can be estimated clinically in two ways: (1) by digital examination with the forefingers placed on the upper lid over the globe, when the eye is closed, and used in the manner of palpating for fluctuation, and (2) the employment of the Schiötz tonometer. The former is of value only as a rough estimate of the grosser changes in intra-ocular pressure, for even with considerable experience it is difficult to detect by this method small but nevertheless significant rises in intra-ocular pressure. The Schiötz tonometer (Fig. 1) is by no means an instrument of scientific perfection and accuracy, and at the best it gives a rough estimation of the compressibility of the globe, but it is useful for the purpose of comparison with readings taken at intervals and it affords a more exact standard than digital examination. A few drops of holocaine, 1 per cent., in the presence of a little weak acetic acid, are instilled into the affected eye. The lids are retracted and held over the upper and lower orbital margins by the operator's forefinger and thumb in such a manner as not to cause any pressure on the globe. The patient is directed to look straight up to the ceiling and not to squeeze or move his eye. The tonometer is gently applied to the cornea and readings recorded with several weights applied to the piston. Owing to daily variations in the intra-ocular pressure in glaucoma it is well in a suspected case to record readings between 9 and 10 a.m. and 5 and 7 p.m. or at such other times as may appear necessary from the facts of the case. The condition of the intra-ocular pressure is the clinical feature of primary importance, and chiefly on this rests the conduct of the case. It is the earliest sign in glaucoma, appearing before any other change. During sleep it rises, culminating in the early morning and lessening with muscular exercise during the day. Troncosco's gonioscope is an instrument which used with a contact glass over the cornea and sclera enables the surgeon to examine the state of the filtration angle magnified by 32 diameters, and on the findings to

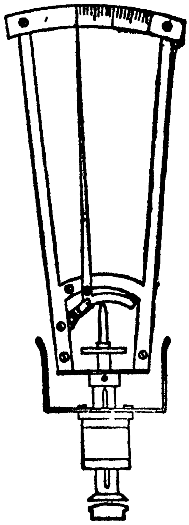

FIG. 1.—The Schiötz tonometer.

determine the mode of treatment to be tried.

In the prodromal stages of glaucoma there is a delay in the development of dark adaptation, a dulling of the sensitivity to dim light and a slowly rising light minimum sense. Special apparatus is necessary to record this alteration in the light sense and is outside the scope of routine clinical application. Later events show changes in the field of vision, such as crescentic enlargement of the blind spot, defects in the nasal part of the field, paracentral scotomas, generalized contraction of the peripheral field of vision and, finally, loss of central vision and blindness. Cupping of the optic disc has already been referred to as the " graveyard " of glaucoma (Elliot). To wait for it to appear as a physical sign is analogous to waiting for the autopsy. The pallor of the optic nerve head, which so often accompanies this sign, is a testimony to the death of nerve fibres and is an unfavourable prognostic sign.

The diagnosis of secondary glaucoma demands a wide knowledge of ophthalmology and the pathological states that may produce a rise of intra-ocular pressure. The employment of the slit-lamp and corneal microscope in the diagnosis of early cases has often revealed changes which suggest that the glaucoma is secondary in nature and not primary, as was at first suspected by other clinical methods of examination.

In secondary glaucoma the anterior chamber is sometimes deeper than normal owing to the accumulation of aqueous rich in colloids that cannot drain by osmosis through the normal channels of exit from the eye. Blood, pus and soft lens matter in the anterior chamber may suffer a similar fate. Iritis, cyclitis, cataract, dislocated lens, vitreous and choroidal hæmorrhages, intra-ocular neoplasms, central vein thrombosis and diabetes under insulin treatment are among some of the more important pathological conditions to be searched for.

A careful differentiation of primary and secondary glaucoma is essential in deciding upon the treatment of a case, particularly is this so in iritis in which the pupillary margin becomes adherent to the lens capsule, rendering the pupil irregular in outline and obstructing the free passage of aqueous from the posterior to the anterior chamber. In early cases of iritis the slit-lamp will reveal some inflammatory cells in the anterior chamber, punctate precipitates of leucocytes on the posterior surface of the cornea ("k.p."), œdema and vascular congestion of the iris stroma. The use of atropine in primary glaucoma spells disaster and the employment of eserine in iritis is not helpful.

TREATMENT

Acute glaucoma.—An acute attack of glaucoma must be regarded as a surgical emergency of a very serious character requiring prompt measures to reduce the intra-ocular pressure. Miosis is aimed at by the instillation of eserine drops, 0·5 or 1 per cent., at five-minute intervals for half an hour and then half-hourly until the intra-ocular pressure approaches the normal or operative treatment is imminent. Eserine should also be instilled into the other eye twice daily, for it is probable that early chronic glaucoma may be present and not yet have been detected. The patient is put to bed, and morphine may be necessary in many cases on account of the severe pain; it may also assist on account of its miotic effect. Heat in the form of continual hot bathings, an electrically heated eye-pad or the application of medical diathermy is of value. The technique of the medical diathermy is briefly as follows. The small active electrode is circular and is covered with several layers of cotton wool wrung out in saline, applied evenly to the closed lids and held in place by a rubber head-band, which must be thoroughly dried before use. The indifferent electrode, also covered by a similar pad, is applied to the forearm. Then the current is switched on and the strength in the secondary circuit gradually increased until a comfortable sensation of warmth is experienced by the patient; this varies between 300 and 600 milliamperes. The duration of treatment is five minutes. Before the electrodes are disconnected the meter is brought back to zero and the main current switched off. Several such applications of medical diathermy will reduce the intra-ocular pressure from about 70 to 40 mm. Hg in many cases. Two or three leeches applied to the temporal region on the affected side play a time-honoured part in the immediate treatment of acute glaucoma.

The intravenous injection of hypertonic saline solution has proved to be effective in reducing the intra-ocular pressure for a number of hours and thereby enabling the surgeon to operate under more favourable conditions. 50 c.cm. of 30 per cent. saline can be used alone or combined with gum arabic to raise the colloid content of the blood and to increase its osmotic pressure. The injection must be given slowly with the patient in the recumbent position. Complications in the nature of giddiness, collapse, and a fall of blood pressure have occurred when the injection has been made too rapidly. This method of treatment is contra-indicated in patients suffering from nephritis, a low blood-pressure, and a feeble constitution. After the injection intense thirst is felt, but it is necessary to limit the intake of water by the mouth. The oral or rectal administration of salines is uncertain in its effects.

If after one or two hours the intra-ocular pressure is not considerably reduced and the pupil not fully contracted an iridectomy should be performed as soon as possible. A general anæsthetic is often necessary, but in some cases the operation can be performed after careful infiltration of Tenon's capsule with novocaine and adrenaline. If the intra-ocular pressure falls to normal and there is satisfactory miosis an iridectomy is still indicated as the patient is liable to a recurrence. It is a more satisfactory operation after an acute attack of congestive glaucoma than trephining or other procedures which have as their object the formation of a filtering cicatrix.

Chronic glaucoma.—In the early stages of the disease and before there is an enlargement of the blind spot or nasal field defect, treatment by the miotics, eserine (0·25–5 per cent.) or pilocarpine (0·5 per cent.), instilled twice daily, may be given a trial and the patient kept under careful supervision. Pilocarpine is less irritating than eserine, but probably slightly less effective. It is a useful alternative in cases in which eserine irritation occurs. Massage of the globe in the morning and evening is helpful in promoting the drainage of the intra-ocular fluids, and anything productive of cerebral congestion should be avoided. Records of the intra-ocular tension and the visual fields should be made at frequent intervals, the former are better recorded in the morning as soon after rising as possible. The patient should be warned of the danger signals associated with a rise of intra-ocular pressure and of the importance of seeking immediate medical attention, also of the bilateral nature of the disease. Failure to keep the intra-ocular tension within physiological limits by miotics is an indication for operative treatment. To wait for visual field loss, cupping of the optic discs, and other classical signs of the later stages of the disease is to invite disaster.

There is no entirely satisfactory operation for the relief of chronic glaucoma. Many procedures have been devised to effect a filtering scar for the drainage of the intra-ocular fluid from the filtration angle through the corneo-sclera or the sclera and into the sub-conjunctival tissues, where absorption takes place. Of these, Elliot's corneo-scleral trephine with peripheral iridectomy is the best in the majority of cases. Lagrange's sclerotomy, Herbert's trap-door sclerotomy, and cyclodialysis are indicated in some instances. Iridectomy in chronic glaucoma without attempting to make a filtering scar is unsatisfactory, as the iris in the vicinity of its root has already become firmly adherent to the back of the cornea, where it obstructs the filtration angle and at operation tears away at the anterior limit of this zone of adhesions and so fails to open the filtration angle. The types of scar produced in the corneo-sclera after trephining are variable as regards their size, appearance and efficacy in filtering. Some become dense and ineffective after several months and the operation has to be repeated if the intra-ocular tension rises. Others are thin and ectatic and occasionally suffer late infection. About 50 per cent. remain satisfactory for five years. The extended use of the gonioscope in practice may afford the ophthalmic surgeon additional help in deciding the type of operation indicated. After operation it is still necessary for the patient to present himself for periodic examination at monthly or two-monthly intervals. In the late stages of glaucoma the eye becomes blind and painful. Excision of the globe is necessary in most cases, and, indeed, is justified as a few contain an unsuspected sarcoma of the uveal tract which, in the later stages of glaucoma, has not been recognized on account of opacities in the lens and media. If excision is refused, some relief from pain may be obtained by injecting 1 c.cm. of 2 per cent. novocaine, followed 5 minutes later by 2 c.cm. of 80 per cent. alcohol far back into the orbit, the puncture being made at a site between the lower border of the external rectus and the outer border of the inferior rectus.

Secondary glaucoma.—The treatment of secondary glaucoma is that of the underlying ocular condition. In iridocyclitis atropine, heat, salicylates, and the treatment of focal sepsis are important. The presence of soft lens matter or blood clot in the anterior chamber may necessitate a paracentesis and wash-out of the anterior chamber after the intra-ocular pressure has been reduced by medical treatment. Dislocation of the lens into the anterior chamber associated with glaucoma requires extraction. For iris bombé iridotomy or iridectomy is necessary. When a malignant intra-ocular neoplasm is detected the eye should be excised. The treatment of secondary glaucoma often presents many difficult problems. The main therapeutic principle is to reduce the intra-ocular pressure by medical means and to be wary of surgical measures in inflammatory cases. If such become necessary, to interfere as little as possible in achieving the effect aimed at by the operation.

Infantile glaucoma (*buphthalmos*).—A condition of raised intra-ocular pressure occurs in infants owing to congenital defects in the formation of the filtration angle, such as a failure of the line of cleavage between the iris root and the periphery of the cornea, absence or malformation of the canal of Schlemm, intra-uterine infections resulting in anterior uveitis and peripheral synechiæ occluding the filtration angle. The ocular tunics are relatively soft and elastic in infancy and become stretched considerably by the raised intra-ocular pressure. The cornea is larger than normal, has a wide base, is prominent, thicker in the centre than at the periphery, and may show grey lines on its posterior surface from ruptures in Descemet's membrane. The sclera is thin and stretched, and all the dimensions of the globe increased. The anterior chamber is deeper than normal and the filtration angle occluded by the adhesion of the iris root to the periphery of the cornea. The canal of Schlemm may be small, narrowed, malformed or absent. The iris is flattened and atrophic. The lens is displaced backwards and much flatter than normal. The optic disc is cupped, the uveal tract, retina and optic nerve show atrophic changes characteristic of glaucoma. This condition is progressive, and treatment by miotics is useless. Surgical procedures, such as trephining, Herbert's sclerotomy, iridectomy, and other manœuvres are disappointing in their results. Both eyes are often affected, but sometimes one only.

CONCLUSION

The onset of glaucoma is in most cases insidious and must be searched for carefully in any person over 40 years of age complaining of neuralgic headaches. Sometimes the symptoms are very slight and appear negligible to the patient. Failure to recognize it and to establish early treatment leads to disastrous consequences. The most important sign before all others is the raised intra-ocular pressure, which is detected only by careful observations made on a patient suspected of glaucoma in the morning and evening, or at such times as symptoms are experienced. The disease is generally bilateral, and it is imperative to keep the patient under observation for the remainder of his life. The results of surgical treatment are on the whole satisfactory in 60–70 per cent. of cases, although the prognosis will depend much upon the stage at which the disease is effectively treated and other factors peculiar to the individual case. Much patience, tact and fortitude are needed by the medical practitioner in piloting the patient through all the changing phases of his mental reactions to the disease, beginning with his initial amused indifference to the situation and ending in some instances with his pathetic terror as realities begin to cast their dark shadows over him.

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SOME MINOR CARDIAC AFFECTIONS

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IF there existed some machine for estimating pleasure and pain it might well appear that over a long period there is a greater amount of actual pain and discomfort caused by minor disorders than by gross organic lesions. One reason for this may be that the pain and discomfort arising from some minor disorder so often attack a patient, who is in generally good health and is therefore more susceptible to any dysphoric sensations, than is one in whom the wheels of being are already running low. In the case of cardiac affections there is this additional disadvantage that any symptom directing attention to the heart can hardly fail to cause some apprehension, though often the morbid sensation in the cardiac area may have nothing to do with the heart.

Though the real origin of many of the minor apparent disorders of the heart may be in the nervous or digestive system, yet their subjective manifestations are to be found in the circulatory system; they are expressions in the region of the heart of a disorder which may be essentially in the nervous or digestive system. Consciousness on the part of the patient of the action of the heart is the salient feature of functional cardiac disorders. These are the patients who feel convinced that there must be something seriously amiss with their heart when palpitation, pains in the cardiac area, or, it may be, extra-systoles force themselves upon their attention. On the other hand, some patients have not the slightest suspicion that there is anything amiss with the heart, when some of these phenomena occur; the presence of cardiac disease may only be discovered on an examination prior to an operation, to childbirth or for insurance.

In all matters connected with heart disease the most important point is to estimate the capacity of the heart to do its work, but in addition to its power of doing its work, it is also desirable to know what the heart can do without giving rise to discomfort or inconvenience. Cardiac neuroses are essentially states of the nervous system reacting upon the heart and its functions; such a neurosis may be defined as a disturbance in the nervous mechanism of the heart caused in various ways without any inherent structural change in the heart muscle; the underlying etiology is in every case psychic or emotional, to which some extrinsic factor, such as tobacco smoking, excess of coffee drinking, or severe gastro-intestinal disturbance may be added. It is the invisible, intangible, and impalpable reaction of the mind, effecting disturbances of cardiac physiology by changes which perhaps may be chemical in character.

Palpitation.—This is a very frequent complaint, and does not necessarily indicate any organic disease of the heart or of any other part of the body; but it is certainly a morbid symptom and often a very trying one; for in health we are unconscious of the action of the heart, as indeed of the other great organs of the body. As a rule the patient is conscious of a rapid, forcible heart beat; the rate may vary between 70 and 140, but palpitation is not necessarily associated with tachycardia; most patients complain of the variability of their heart rate, but it is the consciousness of the heart beat which is important, not the actual rate. The most common causes are :—(1) Dyspepsia, more particularly flatulence; (2) tobacco, which may give rise to palpitation not only in the case of those who smoke, but in those who manufacture tobacco; (3) tea and coffee in excess; (4) keen emotions, particularly fright and anger; (5) neurasthenia; (6) states of anæmia, which lower the blood pressure, accelerate the beat of the heart and so give rise to palpitations. As a rule the palpitation is gradual in onset and passes off gradually; there may be flushing of the face, a sensation of throbbing in the head and giddiness.

There is much variation in the sensations of palpitation : Sometimes it seems as if the heart would almost burst the chest wall; at others as though it were stopping dead; or again, it is described by patients as feeling like a bird fluttering against the chest wall, or the beats are described as being hard and hammering, accompanied by faintness or a gripping sensation at the throat. The face may be pale and covered with sweat, the extremities become cold and syncope may supervene. On the other hand, when the palpitation is followed by cardiac erethism, the face becomes red, there is buzzing in the ears, giddiness and cephalalgia, or there may be a sensation as of a ramrod being driven into the head. There may be a sensation of oppression, a tightness at the throat and sometimes a feeling of indefinable anguish—the *herz-angst* of the Germans, which has points of resemblance with some forms of angina.

Extra-systoles.—Another minor disturbance of the heart is extra-systoles or premature beats, which formerly gave rise to the name of the intermittent heart, and often somewhat serious symptoms were attributed to it. It is now known that their importance is slight and that they may be associated with a perfectly normal heart, in fact few people pass from childhood to old age without occasionally having an extra-systole. They are rare in the first decade of life, but are quite frequent in later middle age and in my experience occur more often in men than in women. In perhaps half the cases the patient is entirely unconscious of these premature beats; in the other half he may have a sensation of fluttering in the chest, or he may be conscious of the long pause and complain that "the heart stops." Extra-systoles are essentially due to abnormal stimuli arising in various parts of the heart muscle; it may be in the auricles or ventricles or in the auriculo-ventricular bundle. Of all cardiac abnormalities, this is the most common; it occurs more often in elderly people than in childhood. Ventricular extra-systoles are far more frequent than auricular in the proportion of ten to one; they are, however, less important clinically, for auricular extra-systoles are more often found associated with some disease of the heart, particularly mitral stenosis.

When the patient is conscious of the extra-systole he feels it as a more or less unpleasant sensation due not so much to the abnormal beat itself as to the pause which follows it, or to the vigorous thump of the first beat after the pause, or there may be a feeling of soreness or a bruised sensation over the cardiac region. The occurrence of many premature beats may at first cause much discomfort, but gradually they tend to lose their disturbing character, so that finally they are scarcely or not at all noticed. At times, however, they may be a source of much distress or apprehension as to the condition of the heart, and a well grown man described them to me as "awful sensations." As to prognosis, the most important thing to realize is that, considered by themselves, there is no evidence for supposing that they are indicative of a diseased heart or that they add to the gravity of any existing morbid condition. Sometimes they are traceable to tobacco or some drug such as digitalis, the omission of which will get rid of the arrhythmia; apart from this the complete re-assurance of the patient as to their unimportance will generally be sufficient treatment.

Paroxysmal tachycardia.—Another important arrhythmia is paroxysmal tachycardia, which perhaps may not strictly be classed as a minor cardiac disorder, because it may sometimes lead to death, though in my experience this is a rare occurrence and when unassociated with structural disease of the heart it is compatible with fair health up to an advanced age. In some ways it might be regarded as analogous to epilepsy owing to its sudden appearance and equally sudden disappearance, the patient rapidly regaining his previous state of health. Like the extra-systole, paroxysmal tachycardia is due to the starting of an abnormal rhythm within the heart, some portion of the myocardium being more excitable than the region of the pace-maker. The pulse rate may reach anything from 160 to 300, but differs from an ordinary tachycardia in that the rate is uniform and is unaffected by respiration, posture or any form of physical exertion. One of the most striking things about paroxysmal tachycardia is that the patient, though somewhat uncomfortable, is not nearly so much distressed as one might have *a priori* anticipated. The first attack may, doubtless, seem somewhat alarming, but later on the patient becomes accustomed to them. He may complain of a fluttering sensation at the chest which, however, is not like that of palpitation. The sudden termination of the attack a patient will sometimes describe as feeling that the heart has jerked itself back into the right place. Some attacks are so brief that the patient never consults a doctor. On the other hand, some attacks may last for a week or more, leading to dilatation of the heart and finally to cardiac failure; but such cases are quite exceptional; in the vast majority the tachycardia lasts for a comparatively short time—a half to 24 hours—after which the patient seems as well as ever. Of course I am only considering cases which have no gross cardiac lesion. Though it may appear at any age, it is most likely to appear first in middle life. On the whole it is rather more frequent in men than in women.

Apart from gastro-intestinal disorders or some special over-exertion, it is difficult to find any definite cause for these attacks. The outlook is generally favourable, except when the tachycardia is very much prolonged and leads to dilatation of the heart, but these are quite unusual. There is not any certain means of averting the recurrence of paroxysmal tachycardia. Perhaps the most useful drug is quinidine in small doses, i.e. gr. v. once a day; sometimes parathyroid gr. $\frac{1}{10}$ t.d.s. has been found useful. During the paroxysm the patient should remain quiet, either seated or recumbent; sometimes leaning forward in a chair with the head low, or lying with the head lower than the rest of the body is helpful. A patient of mine could stop her attacks at the outset by bending forward. Pressure on the right vagus is worth trying for 10 to 20 seconds. As regards drugs for the immediate treatment of the paroxysms, the fact that it so often stops spontaneously of a sudden makes it difficult to draw any conclusion as to their value.

Fainting.—This is a symptom which not unnaturally at once directs attention to the heart and may be a source of some anxiety both for the patient and the friends. In organic disease of the heart fainting is certainly not of frequent occurrence. In cardiac syncope the most obvious feature is the loss of consciousness. Probably this may be due to a sudden diminution of the intracranial pressure, which affects the state of the nerve elements in the brain. It has been thought that the discontinuity at the terminations of the dendrites enables them to vary their distance from the exciting centres and so it may disconnect from all lower centres those that subserve consciousness.[1] This loss of consciousness is also the most striking feature of petit mal and it may well be that the pathological condition underlying each is the same. The diagnosis is not always easy, so-called "faints" which are really epileptic have often been regarded as cardiac; the converse error, however, is rare.

With reasonable care there should not be much difficulty in the diagnosis. True cardiac syncope does not cause an absolutely sudden loss of consciousness. It is rarely so sudden that the patient falls to the ground and hurts himself; nearly always the onset is sufficiently slow for the patient to be able to lie down. Then, too, consciousness after fainting returns gradually with feelings of physical weakness and prostration, but with a correct perception of the environment, while, of course, there is no involuntary micturition, though there may be sweating. In petit mal, on the contrary, the return to the normal mental state is often rapid, but with complete oblivion of all that immediately preceded and followed the seizure. In the fainting attack there is usually an initial pallor of the face, which never occurs in petit mal, which may be preceded by a transient sleepiness, but there is no change in the colour of the face.

It was pointed out by Gowers that the nerve elements of the brain which underlie unconsciousness may acquire a special tendency to that spontaneous development which constitutes minor epilepsy, so that repeated attacks of syncope may dispose to petit mal; thus attacks which were originally syncopal may become epileptic. In view of such possibilities and also because a tendency to faint often depends on general debility, it is well for such patients to avoid all strain of mind and body and particularly physical exertion in hot surroundings; exercise in the open air should be a regular part of the life of such people and sometimes iron tonics will be advisable.

Pain.—The origin of pain is as baffling as that of evil, but whereas ignorance of the latter gives rise to intellectual and mental discomfort among those in the habit of reflecting upon the problems of the universe, the origin of pain forces itself rather crudely and obviously on the attention of every one whether or not they are in the habit of reflecting, and demands from the doctor immediate relief. Some pains are made worse by thinking about them and others are unpleasant mainly because they give rise to apprehension, and it is this apprehension which the practitioner can often remove, particularly in cardiac affections. Pain, apart from angina pectoris, is by no means common in organic disease of the heart, but pain over the region of the heart is common enough. When closely analysed the pain complained of is not really severe: rather it is in the nature of discomfort about the chest without any very distinct localization or special characteristics, but it causes the patient trouble and anxiety out of all proportion to its intrinsic severity.

The most common site for cardiac pain is the region of the apex and next to that the third left interspace; the pain is usually dull and aching and without any special relation to exertion or meals; sometimes there is only a vague sense of uneasiness. The importance of all this lies in the apprehension which it causes the patient to feel, as anything in the cardiac region is apt to spell for him serious disease of the heart. These patients often have a strange aversion from certain postures, such as lying on the left side, which does not inconvenience patients with any serious form of heart disease. With or without pain there is often precordial sensitiveness to touch, so much so, that patients may sometimes try to avoid the ordinary contact of clothing with the heart, especially in the region of the apex.

The most characteristic feature of true cardiac pain is that it is brought on by physical exertion, though the pain may not supervene till some time after the exertion which induced it. Pain associated with a functional disorder of the heart is spontaneous, independent of exercise or any other obviously exciting cause, but may frequently be traced back to some emotional disturbance, set up by domestic, marital, or financial worry. This pain may sometimes be severe and superficially suggest the pain of angina pectoris, but there is not the sensation of impending death and the radiation of the pain is centripetal rather than centrifugal. It usually occurs in women and at an age earlier than that of true angina; also it may be relieved by movement. The pain is not so fixed as in angina, but more diffuse, and the sensation experienced by the patient is that of fullness, tension, or a weight on the stomach; the heart feels too big, but the sensation of its being grasped in a vice is entirely exceptional.

Cardiac pain, though often induced by disturbance within the abdomen, is not necessarily due to a structural lesion of any organ within that cavity. The abdominal conditions which give rise to cardiac symptoms do not as a rule represent grave disease. As an explanation of this it has been suggested that serious diseases of the abdomen depress the reflex centres, whereas the milder affections are associated with an exaltation of these centres.

Conclusion.—In all these minor disorders of the heart, though the prognosis is quite favourable, the patients, unless judiciously handled, may easily drift into a condition of chronic invalidism or become obsessed with the idea that their heart is seriously diseased. As regards treatment, in many cases reassurance as to the comparative unimportance of the symptoms may prove sufficient; when it does not, the importance of regular hours, regular meals, and plenty of sleep should be insisted upon. In conditions of palpitation and tachycardia, hydrotherapy and graduated exercises in the open air are generally helpful. It is well to remember that it is often more important how a thing is said than what is said and how a thing is done rather than what is done.

Reference

[1] Gowers, W. R.: "The Borderland of Epilepsy," 1907, p. 4.

THE MODERN TREATMENT OF CARCINOMA OF THE BREAST

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IN a previous article[1] I dealt with the modern diagnosis of carcinoma of the breast and tried to show how our methods had changed in recent years. The treatment of carcinoma of the breast has taken an even longer step forward and changed even more profoundly, so that it now only remotely resembles what it was ten or fifteen years ago. Then there was one orthodox rule observed by all and that was to wait until diagnosis was more or less certain. Indeed, the surgeon was rarely consulted until the practitioner was sure and then an operation was performed. Sometimes a preliminary incision was made into the breast for diagnosis, but not in the majority of cases. The only operation performed, was termed "radical," though the fact that it was not radical was completely ignored.

Those who were brought up in this school found it almost impossible to break away and submit a patient to a new form of treatment, for whatever the nature of this treatment it was hopelessly condemned by the older school, and they found themselves liable to be tarred by the brush of ostracism which is applied to all whose treatment of carcinoma differs in any from the orthodox manner. Progress, however, always implies change and the trial of new methods. Now several new methods are well established. Contrary to the usual custom I shall begin the discussion of these methods with the inoperable cases and work back to the early ones. I do this because we have arrived at our present procedure from first trying it on inoperable cases, so that gradually we have adapted it to the operable case.

Carcinoma of the breast can be divided into two classes. In the one the carcinoma is extra-thoracic, while in the other it is both extra- and intra-thoracic. As we can have no direct influence upon the intra-thoracic cancer except feebly by X-rays these cases are doomed and hopeless from the first. Patients do not die of cancer of the breast; they die of metastases in the internal organs. Unfortunately, we never know to which class the patient belongs except when the disease is so far advanced that metastases must already be present in the internal organs. There is therefore so much uncertainty about all our procedures that our statistics are essentially untrustworthy.

METASTASES

Metastases, when they appear, are usually the beginning of the end, more especially when they are widely distributed and probably blood-borne. There is, however, nothing in surgery more dramatic than the action of radium upon metastases. Small ones disappear in a week and the larger ones will take three weeks. Radium cannot prevent the appearance of fresh metastases if the cells have already been implanted in the tissues, for metastases can only be treated as they are found. We cannot submit the whole body to radium, and hunt as we will, our treatment is always a field behind our fox. Many of these patients however, can be kept alive for a great number of years.

Case 1.—Mrs. H., aged 56. Left breast amputated in January, 1920. In May, 1927, metastases were found near the right nipple, on the right shoulder and in the middle of the back—all were about the size of a hen's egg. After 1,000 mgm. hours interstitial radiation to each they all disappeared. In the following May a metastasis appeared below the left clavicle, but after 500 mgm. hours of interstitial radiation it disappeared. Several other nodules appeared in October of that year and all were made to disappear in the same manner. In February, 1931, she had four more, and all responded to treatment. She died in June, 1933, with extensive deposits in both lungs.

ULCERATING GROWTHS

These are some of the most satisfactory cases. The ulcerating area can be made to heal and the growth to shrink to small dimensions. The patient is freed from the necessity of constant dressings and there is no longer a foul discharge with an offensive odour. The mental effect of this can scarcely be over-estimated, the patient's physical condition immediately responds to her bettered outlook and she becomes brighter, more interested, and usually puts on weight. Naturally, in such circumstances she must die from internal metastases, but the latter part of her life is made infinitely more happy and the task for those who look after her more pleasant.

Case 2.—Miss S., aged 72. Seen April, 1927. For two years previously had been treated for a mass in the breast by a herbalist. Now has an ulcer 3 inches by 3 inches on the outer side of her breast, hard and bound down to the muscles. Glands in both axillæ. An interstitial dose of 7,560 mgm. hours was given and there was a good reaction. In two months' time the ulcer had healed perfectly. She died in September, 1928, from metastases in the chest and liver.

Case 3.—Mrs. K., aged 50. First seen in May, 1929. Nine years ago noted a lump in her left breast which she neglected until February, when an ulcer had formed and was then 3½ inches by 4 inches. There was a small hard gland in the axilla. She had an interstitial dose of 6,246 mgm. hours. One needle punctured the pleural cavity and an empyema formed, which was opened in June, 1929. In July of that year radium was again used and she had interstitially 110 mgm. hours and surface radiation 3,375 mgm. hours. The ulcer completely healed, but the empyema sinus did not close until March, 1930. She was discharged having put on a stone in weight. In November, 1930, she was readmitted for a mass in her right axilla, 3½ inches by 2½ inches, of which she had known for some weeks, but had not reported. An interstitial of 5,040 mgm. hours was given and the mass completely disappeared. She was quite well when seen in October, 1931, but refused to come for examination in January, 1932.

INOPERABLE CARCINOMA

Cancer of the breast which is inoperable from any cause can only be treated by radium. After interstitial radiation the growth will shrink to a small size and will be replaced by fibrous tissue and the glands by fibrous nodes. So completely will the glands be destroyed that it is not uncommon for the arm to become swollen just as though the lymphatics had been removed by operation. Sometimes better results are obtained by surface radiation and both the growth and the glands can be made to melt away, and in rare cases there is an apparent return to normal.

Case 4.—Miss L., aged 50. Admitted first to St. Mary's Hospital and transferred as inoperable to Mount Vernon Hospital in October, 1931. She was a thin, frail woman, liable to fainting attacks and palpitations, and she had known of lumps in her breast for twelve months. On examination there was a mass in each breast, numbers of large, hard glands in each axilla and small, hard glands above each clavicle. Several of my colleagues, including Sir Cuthbert Wallace, our director, examined her. She obviously had carcinoma of both breasts infecting widely the lymphatic field. She was treated by surface radiation to the right breast 13,440 mgm. hours, to the right lymphatic area 7,040 mgm. hours. To the left breast 12,320 mgm. hours and to the left lymphatic area 7,680 mgm. hours.

28 October, 1931, masses in breasts much smaller.

5 November, 1931, masses hardly felt, glands disappeared, extensive pigmentation. Treatment was discontinued as she became so upset and she was kept in hospital five months for observation. She gained in weight, became stronger, and was discharged 3 May, 1932, without trace of any carcinomatous lesion.

June, 1932, she was in good health. She was shown to members of the British Medical Association during the Centenary Celebrations in 1932 and at present (October, 1933) appears to be quite well.

It has been said by enthusiasts that an inoperable carcinoma may become operable, but I doubt it. In the first place, we are never sure that all the carcinomatous cells are sterilized. They may be just imprisoned in fibrous tissue which renders them harmless and unable to spread. Cutting across the lymphatics may liberate these and set up activity again. Secondly, nearly all such cases are inoperable, not from the condition of the primary growth, but because there is evidence that internal metastases are present. Operation therefore can have no influence upon the outcome; I have never been tempted to operate in such cases unless the patient demanded it, being satisfied with the results produced by radium.

Case 5.—Mrs. W., aged 64. Had known something was wrong with her breast for a month. 1 May, 1929: there was an indefinite thickening and firmness of the breast. Skin attached all over. Hard glands in axilla. Inoperable. Some glands were removed from axilla and found to be carcinomatous with "mitotic figures frequently seen." Interstitial radium 8,664 mgn. hours, reaction good. 10 July, 1929: Interstitial radiation 8,640 mgm. hours.

27 March, 1930: Surface radiation 13,952 mgm. hours. This was

followed by an ulceration and she demanded to have the breast removed. 30 June, 1930: Breast removed locally and searched for growth, but no growth found anywhere.

30 March, 1931: Health excellent, but always complains. 17 July, 1931: Died of mediastinal metastases, no local recurrence.

THE ADVANCED BUT OPERABLE CASE

In the advanced but still operable case the outlook is naturally poor. We have not yet reached the stage where we can say that these cases are suitable for treatment by radium alone, and they are usually submitted to a thorough operation. Wide removal of the breast and subcutaneous tissue, the complete clearance of the glands from the axilla and even from above the clavicle. Unfortunately, a large proportion of these cases show a rapid recurrence of secondary growths upon the chest wall and in the axilla. This is due to the fact that the lymphatics are full of carcinomatous cells, which although harmless whilst in the lymphatics, grow actively when liberated into the tissues. At operation the lymphatics are cut across and these cells escape. This is liable to take place however wide our operation, for by this time the lymphatics in the axilla are blocked and the lymph is finding its way along the lymphatics which accompany the intercostal and abdominal vessels carrying the carcinomatous cells with it.

The operation in such cases sometimes does harm and shortens life. So clearly is this recognized that the diathermy knife is now sometimes used to try to seal the lymphatics during operation and thus prevent the cells spreading. These lymphatics, however, run in the subcutaneous fatty tissue, and I doubt whether the diathermy knife can seal them in a tissue containing as much water as fatty tissue. At first, enthusiasts said it did, but latterly they have been silent on the point. If diathermy can do this, it would be a step in advance; but my experience is that nothing is gained, and as it lengthens the operation considerably, I have given it up. Slow operators find it an advantage. At the operation I always place 65 mm. needles containing 3 mgm. of radium round the vessels at the apex of the axilla and along the subscapular vessels, and two or three are thrust down behind the clavicle into the axilla from the posterior triangle of the neck. These are removed on the third or fourth day.

About a month later, when the wound is healed, a plaque of Columbia paste or sorbo rubber is applied to the chest, axilla and supra-clavicular fossa. About 50 mgm. of radium is distributed over its surface in 1-mgm. or 0·5-mgm. needles. The plaque is worn from 18 to 23 days so that a dose of 17,000 to 25,000 mgm. hours is given. This should sterilize all cells which have escaped during the operation. The great majority of patients with well-established carcinoma, with extensive attachment of the skin and well marked glands in the axilla, die within three to five years from internal metastases. Some are fortunate to survive even without operation, after treatment by radium only.

Case 6.—Mrs. P., aged 44. First seen 14 December, 1929. History of lump for a year. Mass the size of a tangerine cut in half, attached to the skin, hard glands in the axilla. 18 December, 1929 : Glands removed from the axilla. Interstitial radium to breast 8,712 mgm. hours.

20 January, 1930: Lump smaller, more diffuse. Pathological report of glands was carcinoma with " mitotic figures frequent." A sinus leading down to a small area of necrosis in a rib, remained unhealed in her breast. Her chest became full of fluid, which was thought to be carcinomatous pleurisy, but this cleared up. She was a difficult patient and was always finding metastases which did not exist. However, a small lump did appear on her shoulder, and at her request the breast was removed and the lump dealt with. The lump proved to be a lipoma. Subsequently the necrosed rib was removed. She is well and in good health with no trace of disease.

THE MODERATELY EARLY CASE

This is the case most frequently seen in which the skin is only slightly attached and only small or doubtful glands can be felt in the axilla. It presents, however, a more difficult problem as it is suitable for treatment either by the knife or by radium. We have to decide which course to take. I should like to be able to say that radium is as good as operation, but caution and uncertainty prevent me. The place of radium in such cases cannot be known for some years yet. At Mount Vernon Hospital we are conducting an experimental study of these cases, but the time for drawing conclusions has not yet arrived. I have now treated cases with radium at St. Mary's Hospital for seven years, but during the first few years there were no books on the subject and no one to guide or help; many blunders were made partly through lack of radium, but often through lack of knowledge. It is only gradually during the last three to four years that a satisfactory technique has been evolved and become more or less standardized. Now we have reached the stage when it can be said that radium should not be used in certain cases of carcinoma of the breast, while in others already mentioned, the metastases, carcinomatous ulcers and inoperable cases, radium is the only treatment indicated, and although there remains much to be done, the ground is gradually being cleared. What are the pros and cons to be considered in deciding between the knife and radium in these cases?

In favour of radium: The woman will keep her breast, shrunken and shrivelled perhaps, but still she has it. She is not submitted to operation which, in her estimation, involves the use of the knife. She has an anæsthetic for the insertion of the needles, but to her that is nothing. This may be quite illogical, but it is human nature that we are dealing with.

Against radium: There is the possibility of two anæsthetics being needed if two interstitial applications are made, and there is also the possibility of a longer stay in hospital. For one interstitial needling only a ten-days' stay is needed; the patient can then go home and return for further treatment in a month's time. She then has surface radiation and a plaque is worn for three weeks, either continuously or for 18 to 20 hours a day. If the King's Fund radium is used the patient must stay in bed all the time that the radium is worn, but if private radium is used she can be treated at home under the supervision of her doctor and need only see the surgeon once a week. She need not be confined to bed while wearing the radium. There is still uncertainty as to how a patient will react to radium. Too great a reaction will cause necrosis of the skin requiring prolonged dressing which will lengthen the time of treatment. Too small a dose will not be lethal to carcinoma cells.

In favour of the knife: There is the certainty that everything possible has been removed and the patient thinks that she is free. She may spend a shorter time in hospital, though this not always so, as I insist that every operation case undergoes a course of surface radiation a month later in the same manner as the case treated by radium alone. This prophylactic course has quite superseded the prophylactic course of X-rays which I formally gave.

Certain cases are quite unsuitable for radium, such as extensive tumours more than three inches in diameter and tumours in stout people. Conversely, small tumours in thin people are eminently suitable for such treatment. The technique I now use is to insert a gridiron of 3 mgm. needles 65 mm. long behind the tumour. The needles are mounted on copper wire and threaded on skewers 8 inches long. These skewers are thrust in at one side and out the other behind the breast and parallel to each other so that the radium needles are parallel when pulled into position. X-rays show that this is the only accurate method of placing them. Just thrusting the needles in is haphazard. Needles of similar size are thrust up into the axilla round the axillary and subscapular vessels and thrust down from the supra-clavicular fossa into the axilla from above. The tumour is then surrounded by 2 mgm. needles 44 mm. long mounted on copper wire on series of five forming a tiara. I have given up placing needles parallel to the clavicle, above and below it, and I am rather doubtful about the value of needles placed in the intercostal spaces. The needles should remain in position for 168 hours, and no anæsthetic is required for their removal. When they are mounted on silk there is always the possibility of the silk rotting and breaking, leaving the needles in the tissues, and an anæsthetic is then frequently required to remove them, for they catch in fibrous tissue and are difficult to free. With wire they can easily be freed by just twisting the wire.

Case 7.—Mrs. T., aged 63. Seen 23 October, 1929. Had known of lump in the breast for two years. On examination there was a hard mass attached to the skin of the left breast casting a dense shadow; no glands could be felt.

11 November, 1929 : Interstitial radium to breast 12,932 mgm. hours. To the lymphatics 432 mgm. hours. 6 April, 1930 : Surface radiation 10,788 mgm. hours. She had a good reaction and in six months had gained 8 lbs. 3 February, 1932 : Only a small fibrosed mass could be felt. She was seen in 1933 and was quite well.

Case 8.—Mrs. P., aged 55. Lump in left breast upper quadrant 5 cms. in diameter. No fixation to skin or fascia. Glands in the axilla. Dense shadow cast. 8 June, 1931 : Interstitial radium to breast 12,600 mgm. hours and to lymphatics 2,520 hours. Lump became soft and nearly disappeared.

21 September, 1931 : Surface radiation 13,313 mgm. hours. She was shown to the British Medical Association during their Centenary Celebrations in 1932. She was quite well in 1933.

Case 9.—Mrs. O., aged 44. Mass in right breast known for two months, attached to the skin, no glands felt, dense shadow seen. 12 November, 1930 : Interstitial radium 8,160 mgm. hours. 29 November, 1930 : Reaction good, lump smaller. 12 January, 1931 : Surface radiation 18,600 mgm. hours followed by desquamation. 17 April, 1931 : Lump gone. Very well still.

REALLY EARLY CASES

In really early cases of carcinoma of the breast before any of the classical symptoms, such as attachment to the skin, retraction of the nipple or enlargement of the glands, have appeared the diagnosis rests on transillumination and the presence of a shadow when light is placed behind the tumour; or on an exploratory incision. When a diagnostic incision is made and the nature of the suspected mass determined, a radical operation should be performed at once and the same procedure with radium should be followed at the same time and later with surface radiation as already described. Nothing is more fatal than to cut into the tumour and then remove it inadequately. Rapid recurrence is the rule in such cases, even when radical operation is performed a few weeks later.

If the diagnosis rests upon transillumination at an early date we can reasonably assume that the disease is still local. We know that carcinoma is a local disease in the beginning, therefore a local operation should be sufficient for its removal if an adequate amount of breast tissue is removed with it. At the same time these early tumours are eminently suitable for treatment by radium, but then the doubt remains as to whether or not the patient ever really had carcinoma. In such cases, therefore, I believe that it is better to remove the tumour locally and follow up with a course of radium. The microscope will then clear up the diagnosis. If I have been suspicious of the glands I have sometimes treated the node with radium and excised the glands, and have occasionally found evidence of growth, though in many cases the glands were unaffected and the doubt remained which is always an unsatisfactory state of affairs.

Partial operation for early carcinoma is new in surgery of the breast, but I have performed it so often and with such good results that I am convinced of its ultimate place in surgery. A circumferential incision is made opposite the tumour and the breast is lifted from the muscles. A thin, long-bladed knife is slipped between the breast and skin and the two are separated. The amount of breast that is removed depends upon the size of the tumour. About two inches on each side is always removed, sometimes the major portion of the breast and in some cases the whole breast, depending rather upon the site of the tumour. The nipple is left. Bleeding is stayed and the wound sewn up with a drain.

Case 10.—Mrs. E., aged 67, seen 21 February, 1929, with a small indefinite mass in right breast and two glands in the axilla. The mass in the breast was removed locally and proved to be carcinomatous, the glands also were found to be widely infected. Interstitial radium to breast 5,568 mgm. hours. Seen in 1933—quite well.

Case 11.—Mrs. H., aged 49, seen 11 February, 1929, has had discharge from nipple for five years. Lately the nipple has been red, no definite lump could be felt, no glands in the axilla. 3 March, 1929: Through a small incision round the areola, the suspicious portion of the breast near the nipple was removed and radium for 216 mgm. hours was given. The pathological report was " carcinoma." She has been under observation since, and is well.

I have track of only one pre-war case and she is alive and well twenty-five years after this operation. She is one of four who have had local recurrences. At the time no thought of carcinoma entered my mind, and she was operated on for mastitis. It was the recurrence a year later that established the diagnosis.

Now the operation is followed by surface radiation to the chest and axilla, though this was not done in my early cases. In certain cases the glands in the axilla have enlarged later and have been dealt with either by excision or radium. I think we may assume that if carcinomatous portions were left behind in the breast rapid recurrence would take place as we know it does in other parts of the body, this, however, has not been my experience. Local recurrence has been excessively rare—I think in four cases only. Occasionally I have become suspicious of the breast after eighteen months or two years and have then removed it, or at the request of the patient amputated it and had it examined, but in only two cases were any carcinomatous cells found, and then it was very doubtful if they were active.

Case 12.—Mrs. B. B., aged 37, seen 20 January, 1924; noted a lumpiness in right breast a few months ago. No other symptoms—diagnosed as mastitis. 17 March, 1924: Local removal. Pathological report " Definitely malignant . . . papilliferous adenocarcinoma." 29 September, 1930: Small recurrence under nipple. Surface radiation 5,712 mgm. hours. Lump disappeared. 13 February, 1933: Small scab formed over nipple, when picked off leaves

a raw area. The area of skin was removed on 8 September, 1933, and a few carcinomatous cells found surrounded by fibrous tissue. Still under observation and quite well.

THE FUTURE

Such, then, is a synopsis of what seems to me the modern procedure in treatment of carcinoma of the breast, and it can be seen that what I said at first is true—that we have travelled far in recent years. There is, however, another step that I should like to emphasize if we are to improve our results in treatment not only of carcinoma of the breast, but throughout the body, and that is the establishment of a far closer co-operation between the surgeon and the general practitioner. I give the same instructions to my hospital and private patients, namely, that they are to be examined once a month for the first year, once every two months for the second year, once every three months for the third year, and so on until the sixth year, when from then onwards they are examined twice a year. I always tell them that I should like to see them on the anniversary of their operation and I ask the practitioner to send them to me at once if he is at all anxious about them.

I say that this is as good as in insurance, but how few carry out these instructions! The patient forgets to go to the practitioner or leaves the district and refrains from going to a strange practitioner. Some remain free from trouble, others return with well marked metastases which could easily have been dealt with at an early stage. I make a point of writing to old cases once a year, but few even take the trouble to reply. I imagine they wish to forget and persuade themselves that nothing has really taken place; it is the same instinct which makes so many refrain from consulting the practitioner in the early stages. Many thus pass quite needlessly from the credit to the debit side of the account.

Reference

[1] Fitzwilliams, D. C. L.: *The Practitioner*, 1933, cxxxi, 676.

MASSIVE DIFFUSE HYPERTROPHY OF THE BREASTS IN GIRLS

A REPORT OF FOUR CASES

By CECIL P. G. WAKELEY, D.Sc., F.R.C.S., F.R.S.E.

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ALTHOUGH the condition of diffuse hypertrophy of the breasts in girls is a well-known clinical entity, yet very few cases have been examined from the critical pathological standpoint. It is more common in the tropics than this country and consists of a general enlargement of the organ, both gland substance and interstitial tissue participating in the process. It is quite a mistake to say that the hypertrophy is due solely to the fat and fibrous tissue and that the glandular substance takes no part in it. In the four cases under my care local amputation has been carried out; large serial sections of the organs prove without any doubt that there was also an increase of the gland substance of the breast in each case.

The condition may be unilateral or bilateral, more commonly the latter. As a general rule the condition commences about puberty with a gradual enlargement of both breasts, which become firm and indurated. The enlargement increases until the breasts become enormous, hanging down, by their weight giving rise to great inconvenience and frequently neuralgia. In some cases the large size of the breasts causes them to rest on the knees of the patient when sitting. With the general enlargement of the breast there is also a flattening of the nipple and a great increase of the area of the areola. The breasts are functionally useless, and even if the patients do become pregnant the secretion of milk very rarely occurs and there is a grave danger of infection and suppuration of the breast tissue.

The *etiology* of the condition is unknown, but it may be due to some endocrine disturbance, as so often the patients suffer from menstrual irregularities and often from anæmia. The condition is in no way like a true elephantiasis.

Although numerous partial amputations have been advocated from time to time, such operations should be condemned as they leave behind a mass of pathological material which is sooner or later a source of trouble to the patient. To attempt transplantation of the enlarged and attenuated nipple to the upper part of the breast has nothing to recommend it, for the nipple is so stretched and flattened that it has lost all its contractile tissue. If the hypertrophy was a simple overgrowth of the fat and fibrous stroma without any alteration of the glandular tissue, a partial removal might be considered. This, however, is not the case, as the gland substance participates in the hypertrophy and sometimes adenomas are found as well. These conditions seem to me thoroughly to justify removal of the whole of these useless, functionless and frequently painful breasts.

The best method of removing the breasts is by transverse elliptical incisions, which are united to form a transverse scar. This does not show when evening dress is worn and lies in one of the natural folds of the skin over the chest. As the main blood supply of the breast comes from the external mammary from the axillary, bleeding can be adequately controlled by making the upper part of the elliptical incision first. The main vessels are exposed and clamped, and when the lower part of the incision is made there is practically no bleeding whatever. It might be thought that the removal of such large organs would be accompanied by serious shock, but this is not the case if the bleeding is minimal during the operation. Transverse wounds over the chest heal very well, are not subject to keloid formation, and do not give rise to pain afterwards.

The four following cases have come under my observation since 1915:—

Case I.—Jean M., aged 16, a girl of slight build and 5 ft. 2 in. in height, began to menstruate at the age of 13½ years, and when 14 first noticed that her breasts were getting big and heavy. The increase in size continued and the periods became irregular and scanty. In January, 1915, the breasts were enormous and pendulous and extended below the umbilicus, and when she sat down the breasts rested on her thighs. The patient complained of continual neuralgic pain, which was increased at the times of her periods. She was admitted to hospital on January 15, 1915, and the breasts were removed the next day by means of a transverse elliptical incision. The operation did not present any difficulty and there was practically no hæmorrhage or shock. The wound healed well and the patient was discharged on the twelfth day after her operation. The right breast weighed 12¼ lbs. and the left one 14¼ lbs. Histological examination of both breasts showed a diffuse hypertrophy of all the tissues of the breast, the glandular substance containing several small adenomas. The after-history of this case is interesting, for after the operation the patient became quite a bright and intelligent girl and her periods became normal and regular. She married in 1925 and is now the happy mother of three healthy children.

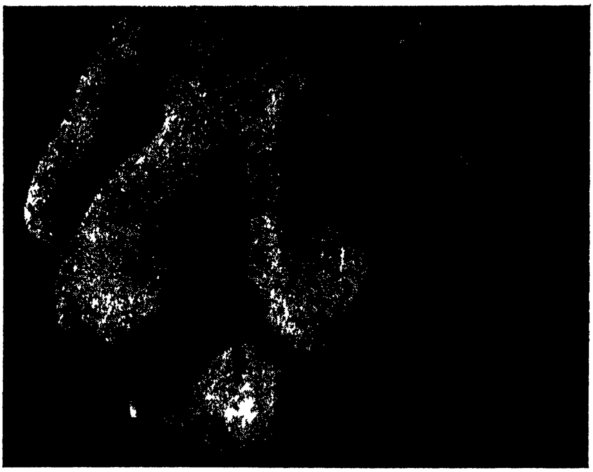

FIG. 1.—Case 1.

Case II.—Kitty P., aged 15, came under observation in 1922 because of the great enlargement of her breasts. Up to the age of puberty she had been a bright and clever child, and had numerous friends. Her first menstrual period commenced at the age of 13, and soon after this her breasts became enlarged and hard. Her periods were always scanty and irregular. At the age of 14 her mental outlook became completely changed, instead of being a cheerful and interesting individual she became sulky and irritable and almost morose. In April 1922, both breasts were removed through a transverse elliptical incision. The wound healed well and the patient was discharged from hospital ten days after her operation. The right breast weighed 10 and the left 11½ lbs. Histologically there was a diffuse hypertrophy of all the tissues of the breast, but no adenomas were found. To the naked eye the breasts appeared to be made up of a colossal overgrowth of fibrous tissue. In this case also the mental outlook wonderfully improved after the removal of the breasts, the girl became more cheerful and took an interest in her work. The periods became regular, but remained scanty. When seen again four years after her operation she was a cheerful young woman, and was engaged in domestic service.

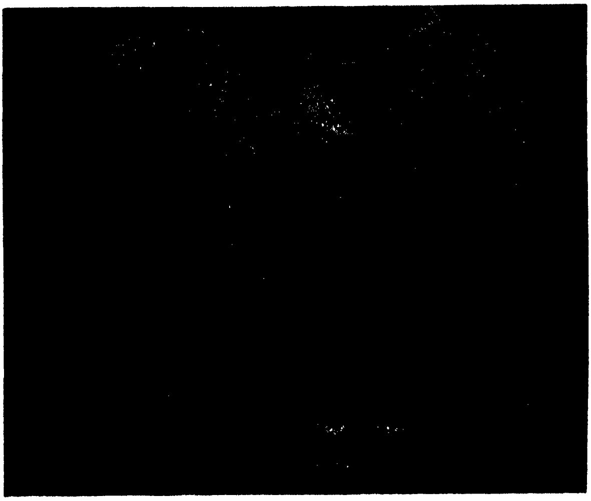

FIG. 2.—Case 2.

Case III.—Alice W., aged 17 years, first noticed that her breasts were getting very large after her first menstrual period at the age of 14. No notice was taken of this, but they continued to grow, and at the age of 16 they were so large that she could not play tennis, because the breasts interfered with her running. During the hot weather of the summer of 1930, the breasts became enormous, and when the patient sat down the breasts rested on her thighs. Her friends thought she was pregnant because when she walked the breasts lay just anterior to the abdomen. The menstrual periods were irregular and somewhat scanty. The breasts felt firm and somewhat hard to the touch. The patient complained of a constant dragging pain which made her depressed. Both breasts were removed in November, 1930, through a transverse elliptical incision. The wound healed by first intention and the patient was able to leave hospital after ten days. The patient was very much pleased to be free from her very cumbersome burden. The right breast weighed 16½ lbs. and contained two large and several small adenomas. The left breast weighed 15 lbs. and also contained several small adenomas. The histological picture was the same as in the two previous cases The patient, when seen a year after her operation, was quite fit and well. She was cheerful and quite a keen tennis player. She stated that her periods were fairly regular, but still inclined to be scanty.

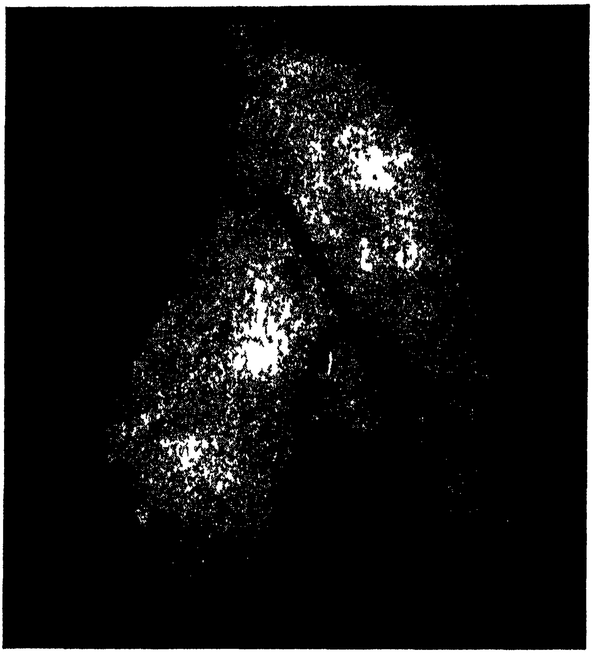

Fig 3 —Case 3.

Case IV.—Edith G., age 18, came under observation in February, 1931, complaining of very large painful breasts. The girl first noticed some enlargement at her first period at the age of 14½, and since that date the breasts had continued to grow. The periods were normal in every respect. The breasts were enormous and firm and indurated to the touch. She walked with a slight stoop because she said it was easier to do so; when she walked in the upright position she experienced a dragging pain over the chest. The

patient came up to hospital imploring to have the breasts removed. The breasts were removed through a transverse elliptical incision; the wound healed well and the patient was discharged from hospital after fourteen days. The right breast weighed 14 and the left 14¾ lbs. Serial sections of both breasts did not show any adenomas; the histological picture was one of diffuse hypertrophy. The patient was much pleased with the result of the operation and returned to her work as a housemaid.

Although the etiology of diffuse hypertrophy of the breasts in girls still remains obscure, there is probably some upset in the endocrine balance, as is shown in the change of the clinical picture after removal of the breasts. The presence of adenomas may play a part in some cases. Young women are always very much upset at the thought of the removal of part or the whole of one breast, and yet these girls with diffuse hypertrophy are only too glad to submit to removal of these abnormal breasts.

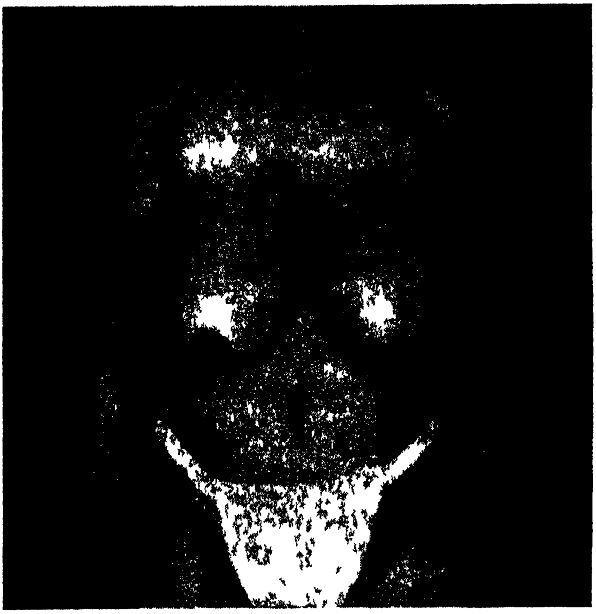

Fig 4 —Case 4

A NASAL TREATMENT OF HAY FEVER

By CLEMENT FRANCIS, M.A., M.B., B.Ch.

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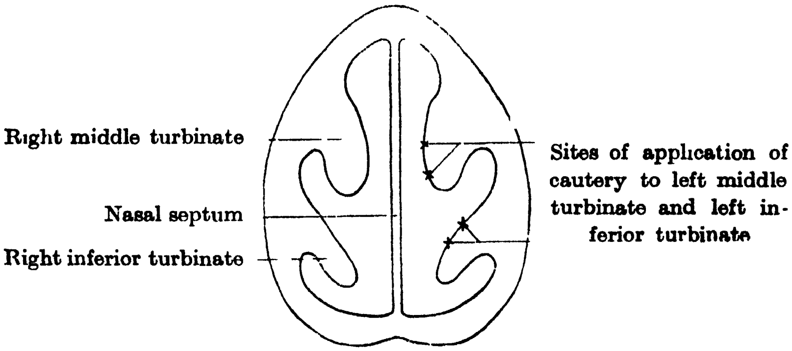
THE treatment of hay fever by the removal of hypersensitive areas in the nose is not a new method. The application of the galvano-cautery or various acids to areas in the nasal mucous membrane has frequently been tried, and more recently zinc ionization has been used.[1] The following is a method which I have found effective in a number of cases in recent years. The treatment consists essentially in removing hypersensitive areas in the nose with the use of the galvano-cautery. I believe that this method would be more widely employed if two factors were carefully considered: (1) The site to be treated; (2) the lightness of the application.

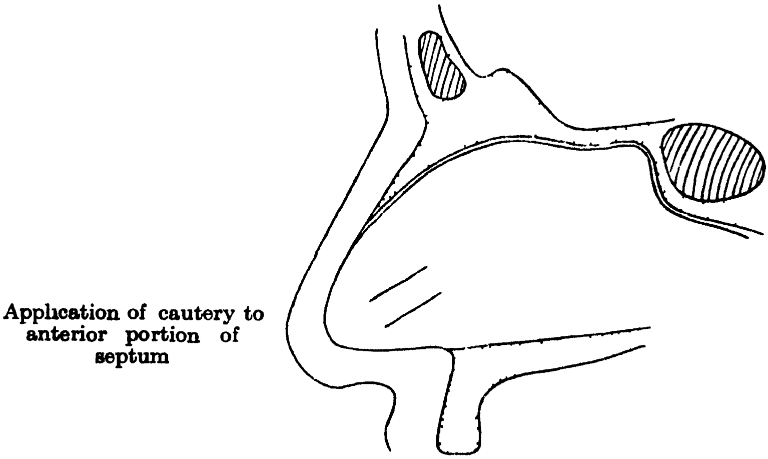
It is important to limit cauterization to areas which are unduly sensitive. If too many areas are treated in this way, more harm than good will be done. In my experience the chief areas in the nose from which the irritation starts are those portions of the mucous membrane which cover: (*a*) the anterior part of the septum; (*b*) the superior margin of the inferior turbinate; (*c*) the anterior margin of the middle turbinate. There may be only one or two sites in the nose which are hypersensitive, and by removing this localized condition, the whole or a greater part of the hay fever may be prevented. It is true that, when the hay fever has actually commenced, the whole of the mucous membrane lining the nose may be in an irritable condition. But before the season has started the hypersensitiveness is nearly always confined to a sharply localized area on one or more of the sites mentioned above. The proper treatment of these areas will stop the onset of attacks, and thus prevent the rest of the nasal cavity from becoming irritated.

As Sir StClair Thomson has pointed out[8], the benefit obtained from cauterizing the nose in hay fever is not proportional to the amount of tissue destroyed. The lightest touch with the cautery point produces the most dramatic results in many cases, and a small burn which produces no pain whatever, no after-swelling, and no slough, may be the means of removing the whole of the hypersensitiveness from a given area. The best time for beginning treatment is a month or six weeks before the attacks are due to commence, although the treatment can be carried out at any time, whether or not the hay fever attacks have begun.

The procedure is as follows:—A small mop of cotton wool is twisted on the end of a probe, dipped in 10 per cent. cocaine hydrochloride solution and wrung out almost dry. Using a good reflected light the interior of the nose is examined, and the septum, inferior, and middle turbinates are lightly touched in rotation with the mop of wool on the probe. It is then fairly easy to judge, both from the patient's observations and by noticing any reflex lachrymation produced, which are the most sensitive areas. These areas are then anæsthetized by painting them three or four times with the cocaine solution. Using a fine cautery point, heated to a dull red heat, the areas should be lightly touched; but the heat should be turned off just before the cautery point is applied. One or more light longitudinal burns should be made, where necessary, on the septum and inferior turbinate, and a few light touches on the anterior edge of the middle turbinate. The marks produced by the cautery should be nearly or entirely gone in a week or ten days; if necessary a second application can then be made, in a similar way, to any remaining hypersensitive areas.

If the treatment is carried out in this way there is no pain whatever, no after-swelling of the parts, no slough is formed, and no after-treatment is required. There is no discomfort if the treatment is carried out before the hay fever season starts, and even when the season has actually begun the only discomfort produced is some slight lachrymation and possibly sneezing on first touching the sensitive spots. This sneezing and lachrymation quickly subside. The relief from the symptoms of hay fever is usually immediate. Sneezing and irritation of the eyes are the first symptoms to disappear, and this is followed by relief of stuffiness of the nose and pharyngeal irritation.


Right middle turbinate
Nasal septum
Right inferior turbinate
Sites of application of cautery to left middle turbinate and left inferior turbinate



Of the last series of 100 cases treated in this way the results can be grouped as follows :—

Group 1.—Complete or very great relief : 74 cases. Cases in this group are those which either have no symptoms of hay fever, or else only slight transient trouble insufficient to interfere with work or recreation in the open air. In two of these cases it was necessary to perform a submucous resection for marked septal deflections, and in one case I removed the tonsils.

Group 2.—Moderate relief: 22 cases. Those who still have attacks, but of a mild nature. In these cases the duration of the hay-fever season is much shorter than before treatment.

Group 3.—Slight transient or no relief: 4 cases.

SOME TYPICAL CASES

Case 1.—A man, aged 59, was first seen on May 7, 1931. He had had hay fever for 30 years, and had tried a variety of treatments without obtaining relief. He suffered severely from sneezing, irritation of the eyes, and general prostration. The attacks commenced in the middle of May. The galvano-cautery was applied to the left inferior turbinate, the right middle turbinate, and the right septum. On May 15 the galvano-cautery was applied to the left septum and right inferior turbinate. On July 28 the patient reported that he had remained completely free from hay fever.

Case 2.—A man, aged 25, had had hay fever for four years. Also suffered from vasomotor rhinitis in winter. First seen on March 29, 1932, when hypersensitiveness was found to be localized to left septum, left middle turbinate, and right inferior turbinate. These areas were cauterized at one sitting. The patient reported on the following September 8. He had had no hay fever at all since the cauterization.

Case 3.—A schoolboy, aged 13, first seen June 19, 1930, had had hay fever severely since he was a small child, and for the last few years he had not been able to play cricket or tennis during the hay fever season without considerable distress. Now in the height of the season. Galvano-cautery to left septum and right inferior turbinate. Seen on June 27, 1930, great improvement. Galvano-cautery to left inferior turbinate. Seen on July 7, 1930, continued improvement, is now able to play cricket in the sun without discomfort. Seen on May 1, 1931, he had not started hay fever yet this year. On examination the left side of nose was not sensitive. Galvano-cautery applied to right middle turbinate and right septum. On April 27, 1932, there had been very slight hay fever last year, not sufficient to interfere with work or games.

Case 4.—A man, aged 30, had had hay fever "all his life." Had been treated by inoculation without benefit. Hay fever now continuous from middle of May to middle of July. Seen on June 20, 1930, galvano-cautery to left septum, right inferior turbinate, and right middle turbinate. May 20, 1931, had very little hay fever after last visit. Galvano-cautery to left middle turbinate and right inferior turbinate. May 23, 1932, no further trouble last year.

Case 5.—A married woman had had hay fever severely for many years. It starts at the end of April if the weather is dry. First seen March 31, 1927. Hypersensitiveness confined to anterior margins of right and left middle turbinates. Galvano-cautery to these very lightly. March 16, 1932, has had no return of hay fever since the previous treatment in 1927.

Case 6.—A married woman had had hay fever and hay asthma for many years. First seen June 13, 1932, when on examination the left side of the nose was found to be much more sensitive as a whole than the right. Galvano-cautery to left septum and left inferior turbinate. June 17, no symptoms of hay fever since, but some hay asthma. On examination the left side of the nose was not now hypersensitive. No scar or other sign of cautery burns was visible. Galvano-cautery to right septum and right middle turbinate. July 16, no hay fever and no hay asthma since last seen.

While it is not claimed that the method described is a cure for all cases of hay fever, it is my experience that relief can usually be given in those cases in which the hypersensitive condition of the nasal mucous membrane is definitely localized. The best results in my series have been achieved where this has been so, and the converse is also true, for the cases (4 per cent.) where no relief was obtained were those in which, either no hypersensitive areas were found or else all the areas tested were equally hypersensitive. The age of onset of the complaint, the length of time during which the attacks have persisted, and the severity of the symptoms are, I find, of less importance from the point of view of prognosis than the presence or absence of localized hypersensitive areas in the nose.

SUMMARY

A treatment of hay fever by light intranasal cauterization is described. The method can be applied to both children and adults. The importance of lightness of application of the cautery point is emphasized, and the areas to be cauterized are discussed. The results in 100 consecutive cases are given, and 6 cases are described in detail.

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[2] Thomson, StClair: "Disorders of Nose and Throat," 1926, p. 207.

MEDICO-LEGAL PROBLEMS IN GENERAL PRACTICE*

V.—DIAGNOSIS OF INTOXICATION BY ALCOHOL AND DRUGS

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THE question of the examination of persons under the influence of drink or drugs has developed an increased importance with the definition within recent years of legal offences in connexion with which the diagnosis of any form of intoxication requires determination according to relevant functional criteria rather than, as hitherto, vague and ill-defined conceptions of "drunkenness." The aim here is to describe briefly the procedure and some methods of examination applicable by a medical practitioner summoned *by or on behalf of* a prisoner alleged to be drunk, or under the influence of drink to such an extent as to render him unable to execute safely the occupation on which he was engaged at the material time. There are many offences in connection with which the question of intoxication may arise, but the commonest and most important are ordinary drunkenness and that of being "under the influence of drink or drugs to such an extent as to be incapable of proper control of a motor-car."

It is important that a careful distinction should be drawn between the following ascending degrees of inebriation: (*a*) being under the influence of drink; (*b*) being under the influence of drink to such an extent as to be unfit in respect of a particular occupation; (*c*) drunkenness. Of these (*a*) that of being "under the influence of drink"—the usual purpose and effect of alcoholic indulgence—is a condition for which the law does not prescribe a penalty; (*b*) constitutes a serious offence in respect of which the penalties may be severe; and (*c*) is a condition of social helplessness or disorderly conduct, in respect of which, however, penalties are usually less severe. It is convenient to proceed according to the following definition: "By alcoholic intoxication is meant the impairment, by reason of the consumption of alcohol, of physical or mental faculties to such an extent as to render an individual unable to execute safely the occupation on which he was engaged at the material time; and by 'drunkenness' is meant a state of intoxication causing disorders of social behaviour or helplessness."

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* This is the fifth of a series of articles on medico-legal subjects to which other authorities will contribute in succeeding numbers of *The Practitioner*.

PROCEDURE

As soon as a person has been detained he is informed of his right, *at his own expense*, to be examined by a private doctor, his own, or one secured on his behalf by the police. At the same time the police surgeon will be summoned and his examination may have begun and be completed before the arrival of the second doctor, at whose examination the police surgeon will be present. There is, of course, no legal obligation on the part of a private practitioner called by a prisoner to attend. His ethical duty, it may be, will depend on circumstances and his knowledge of the patient. In the case of a stranger it may be wise to obtain his name and address, and, also, a definite understanding so far as his condition will permit, as to the fee to be paid. Having accepted the call, it is important not unduly to delay attendance. A second opinion is of most value if obtained at or soon after detention; if for any reason it is based on examination an hour or two (or more) later its evidential value may be small. It is as well to preface examination by asking the prisoner definitely whether it is by his wish that one has been summoned. The question may be put in the following form : " I am Dr. ———. I understand that it is at your request I have been called, and that you wish to be examined by me ? " The question of consent to examination may be of legal interest rather than of practical importance, but the routine use of this form of question may help to prevent misunderstanding or subsequent allegations of examination without consent. In the unusual event of a refusal by the prisoner to be examined the doctor may think it discreet to refrain from physical examination, and either retire or, if he has the assurance of the police that the prisoner did, in fact, ask for his attendance, confine himself to conversation with, and observation of, his patient. These remarks do not, probably, apply to physical examination necessary for the diagnosis of suspected illness or injury.

A prisoner having consented to be examined, the doctor, before proceeding to carry out any *physical* examination, should satisfy himself by conversation and observation that the prisoner understands the nature and quality of the offence to which examination will be relevant, and appreciates the significance and consequences of a medical examination. Such insight is not proof of sobriety, but has a bearing on any subsequent suggestion that a prisoner, by reason of intoxication, was incapable of consent.

The following *times* should be noted : Time of call; time of arrival at place of examination; time of commencement of examination; time of completion of examination. Careful note should be made, of course, of all *clinical evidence* on which an opinion is based.

The police surgeon will probably have made notes of his own examination and other relevant medical facts. Whilst this information will usually be available on request, some doctors have taken the view that such facts or opinions might bias their own conclusions, and have preferred that they should proceed without this preliminary knowledge. Otherwise, so far as circumstances permit, the ordinary procedure of medical consultation should prevail. At the conclusion of his examination the doctor will probably wish to confer with the police surgeon. Unless he sees reason to do otherwise it is desirable that he informs his colleague of his final opinion. He may be asked to state this opinion in writing in the police medical "book." He should understand that there is no obligation that he should do this, although such an entry is obligatory on the police surgeon. The ethics of professional secrecy justify the reservation by a doctor of his opinion. Later, in the witness box he may be directed to disclose it; at the moment, his duty being primarily to his patient, he will consider from that standpoint whether the wiser course is to reserve his opinion, or to state it verbally or in writing, at the time. If he thinks that the examinee is perfectly sober it is conceivable that nothing is to be lost by saying so, frankly and openly at the time. He must further decide whether he will there and then acquaint the examinee of his opinion, or personally or through the police on his behalf invite him to communicate on the following day.

MEDICAL EXAMINATION

The purpose of a medico-legal examination of a person alleged to be under the influence of alcohol is threefold: (*a*) The diagnosis of any illness or injury which may explain signs of incapacity; and/or for which immediate treatment may be necessary; (*b*) determination as to whether, in fact, the examinee is under the influence of alcohol; (*c*) assessment of total faculty impairment, and of the degree to which such impairment is due to alcohol. The examination should take place under reasonable conditions, particularly in regard to light and space. Gait can only be tested in a fairly large room; reading and handwriting tests may be challenged on the ground of poor light; they are of no value if handwriting materials, desk, or light are open to criticism. The examinee should be approached in a friendly manner, and the examination as a whole should be conducted with studied courtesy and tact. Listen, in the first place, to all he has to say. He may be excited and voluble, or naturally resentful at real or fancied injustice; he may be confused or somnolent, and show obvious difficulty in framing and phrasing his ideas. It is wise, usually, not to express or indicate surprise or disagreement with exaggerated or absurd statements. Above all, do not be drawn into argument, particularly concerning allegations of assault or ill-treatment; in his predicament he may appeal to and expect to find in a doctor a natural ally. With the truth, or otherwise, of such allegations, a medical examiner is not concerned, except in so far as he may be able to advance medical evidence concerning them. This preliminary conversation, if pursued in a systematic way, will enable the doctor to gain useful information. Questions and observations are suitably directed to the following: (*a*) Age and occupation, and whether an experienced driver or not; (*b*) history of past or present illness or injury; (*c*) circumstances leading up to arrest. Can he explain why and how he was brought here? Was he tired, sleepy, cold, or hungry? Has he had anything to drink recently and, if so, what?

It is beyond our present scope to discuss at length the differential diagnosis between intoxication by drink and drugs and the numerous pathological conditions with which it may be confused. Persons suffering from certain types of neurosis, of early or chronic psychosis, or of organic nervous disease (notably G.P.I. and disseminated sclerosis) may be easily misunderstood even in their "sober" senses; they are unduly susceptible to alcohol; they are liable to indiscreet or excessive indulgence; and often the consequent mental and physical disorder bears no relation to the quantity of alcohol consumed. These are the cases which may be most easily mistaken for intoxication.

The following tests are invariably applicable as determining (*a*) *questions of differential diagnosis,* and (*b*) *whether, in fact, the examinee is under the influence of alcohol* :—Subnormal *temperature,* due to excessive radiation from the cutaneous capillaries, the normal power of contraction of the small vessels being temporarily lost, is common. A definitely subnormal temperature is of confirmatory value in the diagnosis of (1) alcoholic coma, (2) the third stage of ordinary intoxication, (3) exposure, fatigue or shock. The *pulse* of a healthy adult, following the ingestion of a moderate amount of alcohol, is rapid, full, and bounding. Little stress can be laid on this *alone,* in view of the numerous factors of disease and emotion which may contribute to such an effect. Nevertheless, a rapid and bounding pulse is so uniformly characteristic that its value in a confirmatory sense is very great. The *pupils* in an intoxicated adult are moderately dilated, very sluggish in ordinary light, of variable contractility in bright light, returning slowly to dilatation on withdrawal of light. In undisturbed sleep they become contracted, *easily dilating* in response to any external *stimulus* (such as a pinch on the back of the neck). If the person be then left unmolested for half an hour they return to a state of contraction. This is recommended as a differential test of great value by Glaister and others.[1] The *tongue* is dry, sometimes white with red edges, sometimes furred. The throat and soft palate are parched. There is often excessive thirst, the lips, especially in the confusional and drowsy stages, are dry and sometimes caked around the edges with the residue of beer and stout. Salivation may be excessive; in the confusional stage it often precedes vomiting.

A person who has consumed alcohol, but in whom faculty impairment is not marked, shows a tendency to *lapses* in emotional control and motor co-ordination. Ordinary gait and speech appear normal, but in prolonged conversation lapses can be observed: he stumbles over occasional words, gesticulates unusually, loses the thread of some of his sentences, and so on. The *smell* of alcohol in the vomit and breath indicates only that a patient has taken alcohol. The more definite the smell, the greater the caution necessary before drawing conclusions from subsequent facts. The examinee may have taken or been given a drink because he was ill. But though not, therefore, of great diagnostic value, experience suggests that in some cases the smell of the breath may provide a useful indication of the kind and quantity of alcohol imbibed, and the time at which it was consumed. Following recent consumption the smell of the breath will resemble that of the liquor consumed. After the lapse of two or three hours the dryness of the tongue and pharynx and the passage of alcohol through the circulation to the lungs and skin produce a characteristic disagreeable smell compounded of stale alcoholic and other organic effluvia. In an habitual drinker the excretion of alcohol *via* skin and lungs is increased; this appears to explain the curiously stale odour which often pervades habitués. The amount of alcohol in the blood is an index of the total amount present in the body. Also, the amount present in the urine is an index of the amount in the blood.[2] The routine collection of blood, of urine, and even of cerebro-spinal fluid, has been proposed for the purpose of determining the amount of alcohol present in the body. But the effect of a given quantity consumed can be estimated only in relation to the general personality reactions of a patient; it is not quantitative indulgence, but qualitative control which is the medical question at issue. Also such tests are at present of questionable legality and practicability in the circumstances of police medical examination. As a means, however, of determining the *minimum* amount of alcohol consumed they may have their place.[3]

ASSESSMENT OF FACULTY IMPAIRMENT

Having formed the opinion that a person is under the influence of drink the equally important question arises of assessing the degree, if any, to which, as a consequence, the examinee exhibits signs of loss of control. To some it may seem that to be under the influence of drink should constitute the offence; but this view has no justification in law. It is insufficient that a man should be elated, or even that his faculties should be impaired in a general, vague, and indefinite way. To come within the definition of a legal offence it must be shown that the impairment is of such a nature and degree as to render him incapable of *proper* control (of a motor car). By proper control is meant that degree of efficient control normally exercised by average (including "accident prone") persons. It is stated[4] that in several instances selection tests of "normal" individuals have reduced the frequency of road accidents by 40 per cent. The element of "distractibility," for example, is one which is variably prominent in many persons, and is an example of faculties in respect of which, it may be thought, there should be definite preliminary tests as a condition of a driving licence. But proper control does not depend upon any such (desirable) scientifically ascertained standard of efficiency, and it is important that faculty impairment or loss of control should be assessed with due allowance for all personality traits, whether "distractibility," "absentmindedness," "hastiness of temper," "impetuousness," and so forth, which are characteristic of many sober individuals.

The court usually requires definite evidence not only of particular faculties found to be defective, but also of the examiner's methods and of his interpretations of the results of observations and tests to which the examinee was submitted. Accordingly, all tests should be such as (1) are simple and easy of comprehension by the average layman; (2) the execution of which is easily within the competence of the average sober individual; (3) the significance of which can be comprehended by a judge and jury. This part of the examination, therefore, will depend for its usefulness on : (1) a recognition of the various faculties required for efficient driving, and of their relative importance; (2) signs of impairment of any or all of these faculties; and (3) evidence as to whether such impairment is wholly or in part due to the recent consumption of alcohol. The nature and degree of impairment of faculties depends upon (*a*) the idiosyncrasy, habit, aptitude, and training of the individual; (*b*) the physiological state in relation to food, muscular fatigue, and mental exhaustion, including want of rest and sleep; (*c*) the co-existence of disease or injury; (*d*) the impact of shock, including that of arrest; (*e*) the nature and amount of alcoholic liquor consumed; (*f*) the stage of intoxication.

Alcohol, like other anæsthetics and narcotics, tends to produce its effects in stages : (*a*) the *first* stage, of exhilaration; (*b*) the *second*, of irritability and confusion; and (*c*) the *third*, of drowsiness. In the *first* stage the individual shows an excessive and genial loquacity and assurance; he is liable to acts of imprudence and indiscretion. There are persons of whom, in this stage, it is sometimes reported that they " never drive so well as after a glass of whisky." In the *second* stage inco-ordination is marked, and intellectual disturbance accentuates motor incompetence. The *third* stage, of drowsiness, is responsible for many accidents and arrests. Such drowsiness is sometimes temporary and may be determined, of course, by physiological and pathological factors as well as by alcohol. It may be almost cataleptic in type; when, following executive acts, postural, manual, and pedal attitudes and positions tend to persist after their functional usefulness has passed.

The faculties normally exercised in the driving of a motor vehicle, and in respect of which observations are made or tests applied are: (*a*) sense of time, distance, speed, and relation; (*b*) co-ordination and control of the neuro-muscular mechanisms, including those concerned with visual, manual, postural and pedal co-ordination and control; (*c*) exercise and continuity of attention, voluntary and involuntary; concentration; simple comprehension of external phenomena, such as moving objects, signals, etc.; (*d*) equability and stability of emotional reactions; coolness, patience, restraint, etc.; (*e*) executive capacity—judgment, alertness and correctness of response to sudden and variable stimuli.

Selection tests have been devised and directed towards the detection of " accident-prone " individuals. C. S. Myers[4] enumerates the following " human qualities " which are examined: " Accuracy, speed, and regularity of responses to various signals; resistance to distraction; effective distribution of attention; vision; ability to estimate correctly the speed, size, and distance of other vehicles; readiness to grasp the essentials of a dangerous situation and to respond appropriately to it; confidence and general road behaviour in driving a model car through moving scenery." These qualities can be assessed with considerable accuracy and certainty by means of delicate tests applied under laboratory conditions. It may be doubted if these laboratory methods can be satisfactorily applied under the conditions of police medical examination. In the examination of intoxicated persons co-operation at the best is spasmodic and partial; tests have to be contrived so as to be, when necessary, independent of the examinee's active participation; although applied methods, as in the handwriting tests, are utilized when necessary or possible.

Actual tests may be described under two heads: (1) observational tests; and (2) applied tests. (1) *Observational tests* are directed to: (*a*) manner and behaviour; (*b*) appearance: condition of face and lips, and of conjunctivæ; untidiness; dribbles of saliva, vomit, or liquor on face or waistcoat; (*c*) hiccup; (*d*) ordinary gait and speech; (*e*) wakefulness or drowsiness. An intoxicated person left to himself may go to sleep; on being awakened confusion is more pronounced. Disarrangement of hair, headgear, or of clothing is of such a nature as a normal and sober individual would easily notice and correct. Facial expression may be cheerful, confused, anxious, or drowsy. Persons often exhibit normally after driving for a long period without food and rest a facial expression of strain and fatigue. Persons of education may exert spasmodic and partially successful efforts of self-control during examination, of which less educated and less intelligent persons are incapable. In the examination of individuals who are noisy, abusive, boisterous or garrulous the sober temperamental characteristics must be sought for: people of "compensatory" type—bluff and breezy persons—often conduct themselves "normally" in a way which causes amusement, irritation or annoyance to their friends; they are liable to be misunderstood and they are abnormally susceptible to the effects of alcohol. If such temperamental characteristics are suspected it may be as well to seek an opportunity for conversation with the individual the next day, in order to confirm or revise an opinion of intoxication.

Certain intellectual faculties can be observed. Does the examinee's mind wander abnormally during examination? Does he tend to focus his interest absurdly or unreasonably? Does he lose the thread of his argument? Does he indulge in senseless repetition? Does he introduce silly or meaningless sequences in his remarks? Is he easily distracted during reading, handwriting, or other tests requiring attention or concentration of effort? Can he state the day of the week, the date of the month, etc.? (Many sober persons are often unable to give to order the date, and even the day of the week.) Is his sense of time reasonably acute or absurdly disordered? (Many persons "normally" have a very faulty sense of time; women particularly fail in this test.) Can he describe reasonably clearly familiar routes by which he has travelled?

The capacity for combined attention and effort can be observed by means of habitual or practised purposive acts, such as undressing and dressing before and after physical examination. Abnormalities of posture, gait, and deportment are often notable by simple observation. Many intoxicated persons tend to lounge or sit in a huddled-up position; some walk jauntily, others with slow deliberation; many can walk quite well until confronted with some unexpected demand on their judgment or equilibrium. Ordinary speech often shows at first sight only occasional defects, but emotional stress or intellectual effort may provoke definite inco-ordination.

Applied tests to determine impairment of faculties include all tests which for their performance require the co-operation of the examinee. Should he, for any reason, refuse to give his consent to examination, the doctor may think it wiser to dispense with them. They include tests of habitual acts, such as directional gait, picking up an article from the floor; touching the tip of the nose with one forefinger whilst standing with arms widely extended and eyes closed, and so on; and tests of purposive acts requiring competence of special senses and of intellectual processes; these include turning up an index reference, reading tests, simple mathematical tests, handwriting tests.

Directional gait.—The examinee is asked to walk round the room in a given direction, or following a leader. Persons whose ordinary walking gait shows no marked defect often fail under this test. A crooked chalk line may be drawn around the room and the examinee asked to follow its direction, it being explained that he is not required to keep his feet on the chalk line. In the examination of isolated movements carried out to order it must be remembered that any such movement of any part of the body is often more impaired when carried out to order as a single isolated act than as part of a more complex purposive act in frequent use. On the other hand, the simple movement carried out to order may succeed when owing to inattention or confusion, complex acts of which it is a part fail.

Handling a cigarette.—This is not, usually, a test of choice; but if the opportunity arises we may note inattention or inaccuracy in lighting a cigarette: the examinee may place the wrong end in his mouth, and so on. An intoxicated lady, engaged in conversation, threw away her lighted cigarette end; she made five unsuccessful attempts to place the tip of her shoe on the end without interrupting the conversation. Her fifth effort seemed to satisfy her, for she executed a final scrape in determined style, but the cigarette end remained untouched.[5]

Turning up an index reference.—This is a test of limited application to educated persons, which may be observed when the examinee requests permission to turn up a number in a telephone directory.

Reading tests.—These are useful tests of visual and speech co-ordination, and of the capacity for sustained attention and concentration of effort. Passages should be selected so as to avoid difficult and technical words and unsuitable subject matter. The passages chosen should not be too long; but if too short the value of this as a test of attention is small.

Handwriting tests.—The Report of the British Medical Association Committee on Tests for Drunkenness[6] included handwriting among those tests upon which, *taken by themselves*, little stress can be laid. Certain *pros* and *cons* are worth considering: (*a*) Such tests can, in some respects, provide convincing as well as unassailable evidence in certain cases; (*b*) they depend upon combination of neuro-muscular and mental effort; (*c*) they are delicate tests requiring care and patience for proper application; they cannot be carried through hurriedly; (*d*) they may be executed with fair efficiency by educated persons who show definite signs, otherwise, of intoxication; (*e*) they are relatively severe tests to apply to uneducated persons whose mental faculties are disproportionately affected by alcohol; (*f*) they require the co-operation of the examinee (which, however, is usually given, he being perhaps unduly confident). A method for the conduct of handwriting tests has been suggested.[7] The tests are interpreted and judged from two aspects: (1) *Manner of execution.* They may be performed with excessive laboriousness or hesitation; the examinee may miss or upset the inkpot, break the nib, or cause it to splutter unduly. Some excited drunks write with exaggerated dash and style. (2) *Resultant efficiency.* Blots and splutters may be excessive; words written inaccurately or illegibly; letters ill-formed or repeated, and spelling otherwise absurd; the passage may be written in a sprawling fashion without reference to the lines on the paper; he may write off the paper on to the table; he may be unable to write at all.

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RECENT ADVANCES IN THERAPEUTICS

THE TREATMENT OF DIABETES INSIPIDUS

Although the part played by the posterior lobe of the pituitary in regulating normal water metabolism is still obscure, its anti-diuretic effect with the adjustment of water balance and the correction of dehydration in diabetes insipidus has been confirmed by many workers. In the efforts made to relieve the patient of the necessity for daily hypodermic injections, attempts were made to obtain the specific effect of the posterior lobe by the enteral administration of extracts, but all attempts proved totally ineffective or so variable in their action as to be impracticable. A decided improvement in the clinical treatment of diabetes insipidus was made in 1922 when Blumgart demonstrated complete relief of excess thirst and polyuria by the intranasal application of pituitary extract in the form of a spray or swab as by subcutaneous injection. The technical measures involved were thereby considerably simplified and the discomforts which follow frequent hypodermic injections, especially the not uncommon unpleasant gastro-intestinal and circulatory side effects of the extract, were eliminated. Francis M. Smith (*Journal of the American Medical Association*, March 3, 1934, cii, 660) now shows that successful symptomatic treatment of diabetes insipidus can be obtained in a still easier and distinctly less expensive manner by the nasal insufflation of a dry powdered posterior pituitary preparation. The treatment of diabetes insipidus, in common with other diseases requiring prolonged substitution therapy with a glandular product, presents a distinct economic problem in many cases. It has been found from experience that the powder form of treatment reduced the daily cost about 80 per cent. Two cases of diabetes insipidus of undermined etiology were studied under standard conditions to determine the relative effects of the usual treatment by subcutaneous injections of solution of pituitary and a modified treatment by intranasal insufflation of a powdered posterior lobe preparation. Intranasal insufflation of the powder in doses of from 40 to 50 mg. three times a day was shown to be as effective in maintaining a normal water balance with attendant alleviation of all symptoms as from 1.5 to 2 c.cm. of double strength solution of pituitary, administered subcutaneously. Advantages of the powder treatment include ease of application, absence of intestinal, cardiovascular or other complications, and, most of all, a reduction in cost to less than one-fifth that of solution of pituitary. A moderate dietary salt restriction is also beneficial in the management of diabetes insipidus.

THE TREATMENT OF HAY FEVER

Kehr has published (*Die Medizinische Welt*, March 24, 1934, 404), an exhaustive report on the treatment of hay fever, following an investigation of over two thousand cases. The main interest of the report lies in the instructive alphabetical tabulation of the various remedies, ninety in number, which were found to have a definite beneficial effect on the attacks. Some idea of the scope of the work is given by an alphabetical list of ninety-six methods of treatment (many of which are in common use), which were subjected to a fair test in a number of cases and were thereby shown to be utterly devoid of any effect whatsoever. Of the different treatments tabulated, the relative merits are well shown by means of percentages of cure or definite amelioration, and in addition Kehr gives his opinion as to the real value of each particular remedy. Many of the remedies employed are familiar to English practitioners; the value of desensitization to pollen, or of novocaine, adrenaline and ephedrine applications, for example, is well recognized. A few novel methods of treatment were successful. Application of X-rays, in very small doses of two minutes duration to the nose, greatly benefited half of the sixty-six patients to whom it was given. (Similar short exposures to the chest were found to be efficacious in asthma.) A combination of calcium lactate with a compound of ephedrine in tablet form was more successful in a higher percentage of cases than was either calcium or ephedrine alone. In view of the vogue for vaccine therapy it is of interest to note that while a mixed vaccine caused an improvement in every case in which it was tried, no case gained either permanent or temporary complete freedom from attacks. The dietetic treatment adopted was strict limitation of animal protein, and complete avoidance of raw or half-cooked meats. The diet was balanced by an increase in other fresh, uncooked foodstuffs. On this diet several patients were permanently relieved of their symptoms, and nearly 66 per cent. were greatly improved. The article should prove a valuable guide to the treatment of any particular case of this distressing summer complaint.

COD-LIVER OIL SENSITIVITY IN CHILDREN

Cod-liver oil and its concentrated forms have played an important rôle in the nutrition of infants. But like many other food substances they have at times been responsible for " upsets " in the allergic child, manifesting themselves in the form of vomiting, diarrhœa, urticaria, eczema and asthma, or in a combination of these syndromes. Because of this frequent complication a search has been in progress for a product which could be given to children sensitive to cod-liver oil, whose diets, for allergic reasons, have been inadequate in vitamin containing foods. One can readily appreciate the likelihood of dental caries and the lowered resistance to infection in any child whose diet must be limited to a few foods, and who in addition is unable to tolerate cod-liver oil in any form. Ray M. Balyeat and R. Bowen (*American Journal of Diseases of Children*, March, 1934, xlvii, 529) report the cases of four allergic children in whom, owing to the addition of cod-liver oil to their diets, various types of allergic manifestations developed other than the one for which they first came seeking relief, but who manifested no untoward symptoms when carotene concentrate fortified with vitamin D was substituted. For children who developed allergic manifestations due to cod-liver oil the authors substituted carotene fortified with vitamin D. This product has a potency in vitamin A of approximately ten times that of cod-liver oil. Because of this richness in vitamin A, one can readily appreciate its value for an allergic child whose diet is limited. Since carotene, the active principle in the product, is of vegetable origin, one would naturally expect that a child born with the ability to become sensitive to cod-liver oil would in turn develop a sensitization to carotene. However, owing to the method of extracting the principle with ether, all plant proteins have been eliminated. It is a hydrocarbon and is the specific pigment of carrot, hence the name " carotene." The vitamin D component which is added gives it a " D " equivalent to a regular cod-liver oil. The concentration of vitamin D is such that 10 drops are equivalent to 3 teaspoonfuls of ordinary cod-liver oil. The authors state that they have clinically proved to their satisfaction that children sensitive to cod-liver oil can take carotene concentrate fortified with vitamin D satisfactorily. This product was tolerated by four children who after taking cod-liver oil had urticaria, vomiting, eczema or diarrhœa.

THE TREATMENT OF NASAL SINUSITIS IN CHILDREN

C. G. Kerley and E. J. Lorenze, Junr., publish a study of the nasal accessory sinuses in children, based on 452 cases in which sinus disease was demonstrated by X-rays, out of 670 examined (*Medical Record* (New York), March 7, 1934, cxxxix, 213). Three hundred and eleven of these patients had had their tonsils removed. The authors believe that excessive carbohydrate intake renders the patient less resistant to upper respiratory infections, and cutting down the amount of sugar consumed helped in the treatment of sinusitis in children. In only three cases of this entire group were surgical measures necessary; in two of these there was an acute ethmoiditis and in one a *Streptococcus viridans* infection of the left antrum. In seven cases polyvalent vaccines were employed with successful results. Local treatment consisted of five per cent. argyrol solution applied on nasal tampons of fifteen minutes' duration at five to seven day intervals for four or five weeks. Morning and evening the nostrils were douched with normal salt solution, employing a syringe in the older children and instillation by means of a medicine dropper in infants and young children. The silver preparations were never prescribed for family use. The authors believe that the prompt satisfactory results which they have had in the vast majority of patients were due in part to the fact that the ostium is larger in proportion to the size of the nasal cavities than in the adult, and to the absence of old pathological lesions usual in the sinusitis of adults. Further, in the young child the process is largely of a catarrhal nature with œdema of the mucous membrane. The majority of the patients have been followed up for twelve or more months, with few returns of the sinusitis, due, in the author's opinion, to continuing the use of normal salt solution as daily nasal douches or instillations.

REVIEWS OF BOOKS

Recent Advances in Sex and Reproductive Physiology. By J. M. ROBSON, M.D., B.Sc. London: J. and A. Churchill, 1934. Pp. x and 249. Illustrations 47. Price 15s.

THE author, who has for some time been working at the Institute of Genetics of the University of Edinburgh, of which Professor F. A. E. Crew is the Director, has in this new volume of the "Recent Advances Series" supplied a critical review of sexual and reproductive phenomena in relation to the activities of the sex hormones in the female. Research on this subject has been and is extremely active, and the published results have been somewhat puzzling; there is therefore a real need for an unbiassed presentation of existing knowledge. This the author has done, as is perhaps well shown by his independent attitude in dealing with the work of his colleagues. It is now established that the anterior lobe of the pituitary controls the activity of the ovaries and produces changes of two kinds, namely, in structure—follicular maturation, ovulation, and the formation of luteal tissue—and secretion of specific hormones which induce structural changes in the uterus, vagina and Fallopian tubes. The ovarian changes are ascribed to pituitary hormones—prolan A causing follicular maturation and the secretion of folliculin or œstrin, and prolan B bringing about luteinization and the secretion of the luteal hormone; but the mechanism whereby ovulation is stimulated is not finally settled, and a third gonadotropic hormone has been suggested but not proved. Œstrin produces the changes characteristic of heat or œstrus. The luteal extract contains a substance which produces the changes in the uterine endothelium essential for pregnancy, which has been called "progestin"; further, the luteal extract antagonizes the action on the uterine muscle of the oxytocin, the hormone of the posterior lobe of the pituitary, and maintains the duration of pregnancy; the author, working with Illingworth, has suggested that there may be two hormones of the corpus luteum. The inter-relations of the pituitary and ovarian hormones are complex, and the author has analysed with care and success the other numerous difficulties and problems of reproductive physiology in the female. The concluding chapter on clinical applications shows that the diagnostic procedures, such as the Aschheim-Zondek test for pregnancy, have made important and even spectacular results, whereas the therapeutic results have been comparatively meagre and disappointing.

Vital Cardiology: A New Outlook on the Prevention of Heart Failure. By BRUCE WILLIAMSON, M.D., M.R.C.P. Edinburgh: E. & S. Livingstone. Pp. 352. Price 15s.

IN this treatise, Dr. Williamson has embodied his views on cardiology. He bids us start by relegating our preconceived ideas to the background, and in succinct and accurate language succeeds in showing that the only reasonable method of approach is with cell-activity as the basis. After summarizing the known physiological facts regarding the heart, he demonstrates that the essential factors for cardiac economy depend on *rate* and *force*, and rightly claims that these two factors are all too frequently forgotten in a welter of side-issues, of which electrocardiography is the best example. Apologetically, he even condemns the murmur-hunting stethoscope, and urges that this instrument tends to divert the clinician from the true perspective of cardiac disease. The chapters on tachycardia, probably the best in the book, show its importance as regards coronary circulation and myocardial nutrition, for these depend almost entirely on diastole, at the expense of which all increases in rate are effected. We are introduced to a valuable new test—the apnœa test—which is claimed to distinguish the unimportant and trivial tachycardias, e.g. the psychic, from those which are of moment and urgently call for treatment. Throughout the book the author pleads for the introduction of treatment at an earlier stage than is practised at present, and is undoubtedly right in asserting that there is no valid reason why the information gained at the periodic examinations in schools should not be passed on to the family physician. The inauguration of a scheme to maintain health by the examination of adults will certainly come to pass—to some extent it is already established in America; and we are constantly reminded that in no vital system is such pre-symptom examination more important than the cardio-vascular. Symptoms and treatment are set forth with great clarity, and a valuable index makes reference easy, although (and this is high praise) the greatest benefit will accrue by reading the work as a whole. The only possible bone of contention is a complete lack of references, but the personal and at times informal style is sufficient apology for their absence. The publishers are to be congratulated on the excellent paper and type, and on a most successful if unusual binding.

Clinical Studies on the Physiology of the Eye. By J. GRANDSON BYRNE, M.A., M.D. London: H. K. Lewis and Co., 1934. Pp. 138. Illustrations 49. Price 10s. 6d.

THE author has undertaken this work as an aid to clinicians in the practical application of the results of his experimental work in certain ocular phenomena. He describes his conception of the afferent paths as divided into critical and affective systems; and discusses the pupillary, palpebral and lens effector mechanisms. Chapters are devoted to paradoxical pupillary widening, following somatic lesions, and paradoxical pupillary constriction and the mechanism of accommodation; also pseudo-paradoxical pupil dilatation following lesions of the somatic afferent paths and the afferent paths serving the skin and viscera; and anisocoria. The Argyll Robertson phenomenon is discussed in three chapters, with case reports and the details of a very complete pathological examination made after the death of one of the patients. In chapter 13, which deals with the diagnosis of visual disorders, the author stresses the importance of taking a wide view of every case, and he maintains that "ophthalmology should be undertaken only by one who has had a thorough training in general medicine followed by a long period of general practice." The examination of the patient should be directed towards an investigation of his psychological make-up, his general physical state and the parts played by the endocrine glands and vitamins. Chapter 14 is devoted to some criticisms of the treatment of disorders of accommodation. The author deplores the protracted use of glasses for such conditions and states that while glasses may be a means of temporarily relieving overstrain, when recovery takes place rest and exercise of the ocular muscles should be judiciously alternated. In his opinion glasses, particularly when prescribed as an aid for distant vision and correcting astigmatism, prevent the proper use of the external ocular muscles co-ordinately with the muscles of the limbs and trunk in the avoidance, approach and standstill reactions. The beneficial effects of exercise of these muscles is obtained not by artificial ocular exercises but by the alert and natural use of the eyes in playing games. This book will interest physiologists, research workers and clinicians in general medicine, neurology and ophthalmology. Some of the opinions expressed are unorthodox and should be read in a critical spirit.

Diseases of the Eye. By SIR JOHN HERBERT PARSONS, C.B.E., D.Sc., F.R.C.S., F.R.S. Seventh edition. London : J. & A. Churchill, Ltd., 1934. Pp. 676. Figs. 353; 21 Plates. Price 18s.

THAT this excellent textbook of ophthalmology has reached its seventh edition is sufficient testimony of its value to medical practitioners and students. It already enjoys an exalted place in the ranks of medical textbooks and its high standard of work is well maintained throughout this edition. On account of the great advance in the knowledge of the physiology of the eye in recent years the author has rewritten chapter 2, dealing mainly with the circulation of the intra-ocular fluids and the intra-ocular pressure. Sections are devoted to anatomy; the methods of examination of the eye; the pathology of the ocular structures; refractive errors and anomalies of accommodation; disorders of mobility of the eyes; sympathetic diseases; diseases of the ocular adnexa and preventive ophthalmology. Modern methods of treatment are incorporated and the book is amply illustrated with photographs, photo-micrographs, diagrams and coloured plates. The chapters dealing with the causes and prevention of blindness and the hygiene of vision have been enlarged. Appendix 1 gives a useful summary of the principal points in the preliminary investigation of the patient. Appendix 2 contains some valuable therapeutic notes about lotions, pigments, ointments, drops, hot bathings, local anæsthesia, serum and vaccine therapy, the treatment of syphilitic affections, and the care of surgical instruments. Appendix 3 gives details of the visual requirements of candidates for admission into the public services. The book is admirably and lucidly written and throughout combines the mature wisdom of the scientist with the practical knowledge of the clinician and teacher in presenting a balanced account of ophthalmological problems.

Treatment in General Practice. By HARRY BECKMAN, M.D. Second edition, revised and entirely reset. Philadelphia and London : W. B. Saunders Company, 1934. Pp. 889. Price 45s.

DR. BECKMAN'S book on treatment in general practice has proved very popular in America, where the first edition was published in 1930 and reprinted in 1930 (twice), 1931 (twice), and 1933. It is easy to understand this success, for the book is very readable, succinct, and definite in its indications of treatment. Now and then we were inclined to think its account of certain methods of treatment almost too brief to be of real value to the practitioner, but it must be admitted that in such cases the methods were alternative to others. Among the new sections are an evaluation of the Felton serum in pneumonia, a review of agranulocytosis, food allergy, hyperinsulinism, new treatments of hiccough, and an exhaustive consideration of eczema. English practitioners should find Dr. Beckman's book as useful as their American colleagues have undoubtedly done.

Life in the Making: The Story of Human Procreation. By ALAN FRANK GUTTMACHER, Associate in Obstetrics, Johns Hopkins University. London: Jarrolds, 1934. Pp. 288. Illustrations 8. Price 10s. 6d.

THIS volume has a rather striking jacket which will probably appeal to some lay readers, for whose instruction it is more likely to be effective than for serious medical men. It is brightly written in six parts, headed—" How life begins," " sexual rhythms," " male and female," " sex determination," " sterility and fertility," and " twins." It contains many interesting and curious instances and records of the past; for example, the story of an Italian woman who had twenty children at two births, nine at the first and eleven at the second, and that of the order of the Skoptsi which originated in Russia in 1757 as an offshoot of an austere Quaker group, who practise castration. This remarkable sect has been violently persecuted in Russia and has largely migrated to Rumania; they believe that their founder is still alive and will ascend the Russian throne some time and then compel the world to adopt universal castration. On the back of the jacket it is stated that the author is an identical twin, his brother being a well-known criminologist.

Damaged Lives: The Novel of the Film. Adapted by C. J. EUSTACE. London and New York: Putnam and Co., 1934. Pp. 121. Price 3s. 6d.

THIS is the text of a film used as propaganda in the combating of venereal disease, and comes out with the backing of the British Social Hygiene Council. Mrs. Neville Rolfe, the Secretary of the General Council, writes an admirable introduction showing the dangers the young run, from insufficient knowledge, of contracting syphilis and gonorrhœa and recommends " Damaged Lives " as a story typical of real life treated with knowledge and restraint. In an appendix Dr. Drummond Shiels, the medical secretary, gives an account of the work of the British Social Hygiene Council which, founded in 1914 before the war, changed its name from The National Council for Combating Venereal Disease to that of the British Social Hygiene Council in 1925. The story, which is laid in New York, is tragic and well adapted for its purpose of instructing those who do not realize the catastrophes due to venereal disease.

NOTES AND PREPARATIONS

ORTHO-GYNOL

Ortho-gynol is a new contraceptive, introduced by Messrs. Johnson and Johnson, Ltd. (Slough, Bucks.), who state that it is both an effective mechanical barrier and contains a satisfactory spermicide, while it is non-irritating and does not destroy the natural vaginal flora or secretions. The ingredients are boric acid, oxyquinoline sulphate and glycerine, contained in a water-soluble vegetable gum base, which dissolves very slowly in the vaginal secretions. It is prepared in tubes, with each of which is an applicator so that the contraceptive can be effectively applied. The manufacturers will send a sample to any member of the medical profession who mentions *The Practitioner*, and it is to be hoped that medical practitioners will keep accurate clinical records of the effects and value of this new contraceptive.

" MOTHERHOOD "

" Motherhood " is the title given to a very attractively produced " guide for mothers " which is published by Messrs. Cow and Gate (Guildford, Surrey), and of which a fourth edition has just appeared. Although this booklet is frankly published by a firm which manufactures various well-known infants' foods, it is much more than mere propaganda for their own products. The fourth edition has been completely revised and enlarged; the first part deals with the mother and particularly the nursing mother, the second part with the baby, the importance of breast feeding being emphasized, the third part with the baby's health, and the fourth part with feeding and care, including the care of the baby overseas.

BAD NAUHEIM

The fame of Bad Nauheim as a centre for the treatment of affections of the heart is well known, and this spa has now decided to arrange inclusive terms for visitors, to include hotel or pension, with board, attendance, heating and light, along with the fees for the course of baths and for medical attendance. Special medical services, such as X-ray examination, etc., will be extra. There are three groups of inclusive cures, RM. 290, RM. 330, and RM. 380 (the rate of exchange is 13 register marks to £1). The larger hotels which do not belong to these three price groups have published a special folder on inclusive terms, which can be obtained on application to the Kur Direktor, Bad Nauheim, Germany.

SANOCRYSIN AND OLEO-SANOCRYSIN

Messrs. H. R. Napp, Ltd. (3 and 4 Clements Inn, Kingsway, W.C.), state that as from April 1 they have been appointed sole distributors in the British Empire (excluding Canada, Australia and New Zealand) for sanocrysin and oleo-sanocrysin, the gold salt preparations employed in the treatment of tuberculosis and rheumatoid arthritis.

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NON-MALIGNANT CONDITIONS OF THE TONGUE

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OF the numerous non-malignant pathological conditions affecting the tongue, I have selected the following few for description as they present certain difficulties as regards diagnosis or treatment.

ENLARGED PAPILLÆ FOLIATÆ

The papillæ foliatæ are part of the normal gustatory apparatus. They are situated on each side of the postero-lateral border of the tongue, immediately in front of the anterior pillar of the fauces. They are covered with mucous membrane, vary in size and in the number of lobulations. A good light is necessary for their inspection, the tongue is pulled forward and to the opposite side and the cheek retracted; this stretches the pillar of the fauces and brings into view a series of small elevations, irregular in size and extending over an area of about one square centimeter. The normal appearance of the papillæ foliatæ varies from a slight elevation to a definite aggregation of four or more nodules separated by folds of mucous membrane.

In the vast majority of people the presence of well-developed papillæ is ignored, but from time to time a patient becomes aware of their existence either from casual inspection of his mouth in a mirror or from a slight discomfort probably due to inflammation. I have also seen patients in whom hypertrophy of the papillæ was suspected to be an early neoplasm, either by the patient himself or by his practitioner. The frequency with which such cases are seen is an indication that the importance of early diagnosis of malignant disease is at last beginning to be recognized.

Hypertrophy of papillæ foliatæ is either *congenital* in origin, when the gustatory apparatus itself is over-developed, or *inflammatory*, when the lymphoid tissue, which is part of the normal structure, is affected. It is chiefly the latter type which causes the patient to seek advice. The clinical history of such cases is that following an attack of tonsillitis or pharyngitis discomfort was noticed in the lateral aspect of the tongue; it never amounts to actual pain and the symptoms are slight. It occurs in both sexes in middle-aged people, and on examination it is found that the papillæ are somewhat œdematous and the mucous membrane reddened. The importance of this condition is the differential diagnosis. The characteristic site and extent of the papillæ, the fact that they are bilateral, that the mucosa is normal, and that no induration is felt on palpation should be sufficient to show the true nature of the condition. Treatment should be confined to a mild mouth-wash or local application of tincture of iodine once or twice.

LEUKOPLAKIA

Leukoplakia is the commonest form of chronic superficial glossitis. It is characterized by the disappearance of papillæ, and keratinization of the epithelium followed by formation of scar tissue. Clinically, there are patches, milk-white or pearl coloured, oblong, oval, lozenge-shaped or serpiginous. The commonest situation is the dorsum of the tongue, but they occur also on the buccal mucosa and on the gums, and at times on the floor of the mouth. It is a disease of the true dermal layer and is definitely pre-cancerous. It occurs in middle life in men and women, and is nearly always the consequence of chronic irritation. Syphilis, dental sepsis, trauma from teeth or dentures, smoking, alcohol and spices have all been blamed as etiological factors; no doubt this is true, but a predisposition to the disease must be recognized and it must be emphasized that leukoplakia often occurs in patients free from any syphilitic taint.

Clinically the appearance of the tongue varies with the stage of the disease from the single red, smooth "smoker's patch" to a complete loss of papillæ, fissuring and presence of white patches. Symptoms are slight and the disease, as a rule, has been present for many years before advice is sought.

Treatment of chronic superficial glossitis.—Treatment varies with the stage and extent of the disease. For practical purposes it can be subdivided into three groups:—(1) chronic superficial glossitis, with loss of papillæ, fissures, but absence of white patches. In such cases treatment consists of (*a*) oral hygiene, dental attention, mild mouth-washes, abstinence from tobacco, alcohol, and spices; (*b*) heliotherapy, preferably by the Kromayer lamp, which should be given by an expert in moderate doses, never producing a violent reaction. (2) The single "white patch." This should be excised with the knife, and not by diathermy. (3) Extensive white patches, with heaped-up warty epithelium. This is definitely a pre-cancerous condition.

Since the publication by Cramer of the effects of radium on pre-cancerous conditions, I have tried radium treatment on this third type of chronic glossitis. Radiation can be given either by means of intra-oral applicators carrying radium or by the interstitial method. Indifferently screened radium is used (0·5 mm. silver or 0·3 mm. gold). If interstitial radiation is used the seeds are withdrawn at the end of 48 hours. A typical radium reaction follows, which is painless and subsides in 14 days. Peeling of the tongue occurs and leukoplakial patches disappear. The end result is a smooth, pink tongue covered with epithelium devoid of papillæ, not unlike the normal buccal mucosa. I have employed this method for the past 18 months and am so far satisfied with the results.

It must be emphasized that application of caustic to patches of leukoplakia precipitates the development of cancer and should never be used.

ACUTE MULTIPLE ULCERS

Acute multiple ulceration may be part of a general stomatitis or may be limited to the tongue and floor of the mouth. It is essentially a recurrent condition of unknown etiology; it occurs at all ages and in both sexes. The ulcers are small, have a grey surface and a red border; each ulcer lasts only a few days, but the patient may have a series of lesions lasting several months. *Treatment* consists in oral hygiene and an application of 2 per cent. solution of chromic acid to the lesion and small doses of iron.

Herpes attacks the tongue as other parts of the body; the characteristic lesion consists of a series of vesicles which soon rupture leaving a shallow ulcer. Pain varies, and may be slight or severe and unbearable, as in other forms of herpes. The disease chiefly affects children between the ages of three months and six years; it is accompanied by fever, malaise, loss of appetite, constipation, fœtor of the breath, and swelling of the submaxillary glands. *Treatment* consists of saline aperients, local application of glycerine and borax, mild mouth-washes and the administration of radiostol, calcium and iron.

HAIRY TONGUE

This condition is of rare occurrence. It is characterized by hypertrophy of the filiform papillæ in one part of the tongue—a triangular area in front of the circumvallate papillæ. Needless to say, no hairs are present, but the papillæ grow to such an extent as to give the condition the appearance of hair. The condition is also known by the name of nigrities or melanoglossia from the dark colouration of the elongated papillæ; the colour at times black, but more often brown, is apparently due to bacterial infection. The tongue itself is healthy and there is no induration of the deeper layers. It is frequently seen in mentally deficient patients. *Treatment* consists in scraping the affected part of the tongue with a spatula and the local application of a 2 per cent. solution of salicylic acid. The condition often disappears spontaneously. If resistent, X-radiation will rapidly lead to shedding of the elongated papillæ.

NÆVI, ANGIOMAS, LYMPHANGIOMAS

Vascular tumours of the tongue are not uncommon. They are, as a matter of fact, the commonest innocent tumours found in the tongue. They are grouped in three classes: those on the surface of the tongue—nævi; deep-seated tumours arising in the substance of the tongue and eventually growing to the surface—angiomas; and primary tumours consisting of dilated lymphatics forming vesicles and secondarily leading to mixed vascular tumours—lymphangiomas.

Nævi, as a rule of the capillary type, may occur as single or multiple lesions on the tongue, lips, gums and buccal mucosa. They may be congenital or may occur first in childhood. They are painless, but bleed easily and profusely. The cavernous type or *nævous angiomas* are more extensive in size, covered by normal epithelium, compressible without pulsation, of a blue or livid hue. Treatment is essential, as the risk of hæmorrhage is always present and if left untreated they tend gradually to increase in size. Small capillary nævi can be excised, obliterated by carbon dioxide snow, or coagulated by the diathermy; nævous angiomas can be either excised or treated by diathermy; CO_2 snow is not applicable; injection of sodium urethane, salicylate or sodium morrhuate on the lines used for varicose veins could on theoretical grounds be tried, but no reports of this treatment are available.

Lymphangiomas or lymphatic nævi are formed by a group of dilated lymphatic spaces producing vesicles upon the dorsal surface of the tongue. Between the vesicles and protruding into the interior of the vesicles are bright-red capillary loops. If a capillary loop ruptures into the interior of a vesicle, the colour of the vesicles changes to bluish black. Clinically they form vascular tumours consisting of a conglomeration of white, blue and red vesicles; they may be situated in any part of the tongue, anteriorly, where they are easily seen, or in the vallecula where they are only seen with the aid of a laryngeal mirror. The condition may be unilateral or involve the whole tongue. It is a slowly progressive disease leading to defects in speech, hæmorrhages, and occasional ulceration. Attacks of inflammation, no doubt due to infection, occur from time to time, and are followed by a progressive enlargement of the tongue. The condition is extremely sensitive to radiation, and the results from radium have been so good that excision of these tumours should never be contemplated as the first therapeutic measure. Records of cases of lymphangioma of the tongue treated by radium date back to ten years, and the method can be considered as having proved its value and is not associated, in expert hands, with the risks attendant on excision.

TUBERCULOSIS OF THE TONGUE

The great majority of these cases are secondary to tuberculosis of the respiratory tract. Primary tuberculosis of the tongue is very exceptionally found, the tongue being apparently resistant to the tubercle bacillus. Infection may occur after injury to the mucous membrane, from bacilli present in the sputum or by direct spread in cases of lupus of the face. The lupus form is seen in young women, whereas men form the greater proportion of cases due to pulmonary disease. The commonest site of tuberculous ulcer is the tip of the tongue, but they are also found on the frenum and on the lateral borders.

The clinical varieties seen are: (1) Miliary tubercles, as a rule a terminal phenomenon, and always associated with miliary tuberculosis of the lungs. (2) Tuberculoma, later becoming a cold abscess. (3) Superficial ulceration with fissures. (4) Deep ulceration, with a pale granulated base covered with mucus, with bevelled edges, redder than the surrounding tissue and no surrounding induration. Small satellite ulcers may be present. At first painless, the lesion becomes increasingly painful as the disease progresses, till extreme tenderness makes eating a very real ordeal. Enlargement of submaxillary glands is the rule. The appearance of tuberculous ulcers on the tongue is of very grave prognosis, death resulting within 18 months or two years. With treatment, however, the lesions may be made to heal at least for a time. During recent years a number of cases have been reported with complete recovery, due no doubt to improved methods in the treatment of pulmonary tuberculosis.

Treatment.—The first essential is to observe the principles of treatment of tuberculosis generally, as the lesion on the tongue must be regarded as a local manifestation of a generalized infection. Active measures to the tongue are dictated by the general state of health and the local condition. If surgical measures are decided upon and the local lesion is suitable for excision, surgical diathermy is preferable to the scalpel, as thus the lymphatics are sealed off, hæmorrhage is lessened and the spread of infection minimized.

If a tuberculous ulcer be excised with the diathermy needle, suturing is not advisable as the stitches are likely to cut through and infection along the suture lines is probable, whereas a raw surface left after diathermy excision heals rapidly. The selection of cases suitable for treatment requires a good deal of judgment, and co-operation between physician and surgeon is here, as in all cases of tuberculosis, greatly desirable. If surgical measures are contra-indicated, radiation therapy should be considered. Ultra-violet rays applied by a small water-cooled mercury vapour lamp (Eidinow, Kromayer) has proved a great boon both in cases where excision is impossible and after diathermy excision. Superficial ulcers usually respond favourably to treatment. Chronic lesions with peripheral fibrosis and those not responding to light treatment, will benefit from X-radiation or surface application of radium, similarly to cases of lupus.

ACTINOMYCOSIS

This infective granuloma is caused by the ray fungus and belongs to the group of the streptothriceæ. Sixty per cent. of all cases occur in the head and neck, and not uncommonly the tongue is affected, primarily or together, with adjacent tissues. Although regarded as rare in man, I have seen a dozen cases in the past ten years. The lesion may be a single hard nodule or extensive infiltration of half the tongue; its "hardness" is characteristic, and actinomycosis should be suspected in all subacute or chronic swellings in the mouth. For a long time the epithelium over the swelling may remain normal. On exploration only a small amount of pus is found, but the typical "sulphur granules" are diagnostic, and examination under the microscope confirms the diagnosis. The prognosis in early cases is good with intense iodine administration. But iodization combined with radiation by X-rays or radium is unquestionably the most successful treatment to-day.

Most cases of actinomycosis of the mouth, even those with well-established sinuses and involvement of the cellular tissues of the neck, can be completely arrested by the combined methods. Heroic doses of iodine can be given daily. My own cases are given: (1) colloidal iodine, ʒii t.d.s.; (2) French tincture of iodine, ♏ iii t.d.s.; (3) potassium iodide, gr. 60 t.d.s. So that iodine in some form is given every two hours throughout most of the day. Intravenous administration of colloidal iodine presents no advantage. Very large doses are, in my experience, tolerated much better than smaller doses. Iodine must be continued till all signs of the disease have disappeared. Radiation is intermittent, always external, and requires specialized knowledge to be given with safety and efficiency. If fluctuation occurs, a small incision or incisions are made in the tongue and the pus evacuated.

LINGUAL THYROID

This is a congenital abnormality. It may be associated with a thyro-glossal cyst, with aberrant thyroids elsewhere (in the submental region), or it may represent the only thyroid tissue, the normal thyroid being rudimentary. The lingual thyroid is, as a rule, situated in the vallecula, and the patient may go through life in total ignorance of its existence. It may be discovered accidentally and give rise to difficulty in diagnosis. It varies in size, is purplish red, mamillated or cystic. In young girls, swelling concomitant with menstruation may attract attention to it at puberty. At times hæmorrhage reveals the presence of a lingual thyroid. Each case should be considered on its merits; the great majority of cases require no treatment, and it cannot be emphasized too strongly that the mere presence of a lingual thyroid is no indication for its removal. Excision is, of course, definitely contra-indicated in the absence of symptoms, or if the lingual thyroid is the *only* active thyroid gland. However, if the tumour be large or hæmorrhage frequent, or if the nature of the swelling be unknown or suspected to be malignant, biopsy is indicated. This should be done under gas and oxygen anæsthesia administered through a nasal catheter passed into the trachea and the pharynx well plugged. The diathermy needle should be used and hæmorrhage fully controlled.

DIFFERENTIAL DIAGNOSIS OF NON-MALIGNANT CONDITION OF THE TONGUE

The most important practical point in the diagnosis of various non-malignant conditions of the tongue is their differentiation from malignant lesions. It is, of course, important to know whether an ulcer is syphilitic, tuberculous or traumatic, or if a tumour is a surgical curiosity, such as a lipoma or fibroma, but the essence of differential diagnosis is the distinction of benign from malignant tumours. It often happens that the practitioner forgets that a positive Wassermann reaction, the presence of a sharp carious tooth, or tubercle bacilli in the sputum, are not in any way a guarantee that malignant disease is not present, and many a tongue typically syphilitic has been allowed to become the seat of quite inoperable carcinoma while energetic anti-syphilitic treatment was being carried out. There is only one possible route to safety—no lesions in the tongue should remain undiagnosed, intervals between observation should never exceed two weeks, and a biopsy should be done in every case if there is the least suspicion of malignancy. The absence of enlarged glands, like most negative signs, is quite valueless in assessing the nature of a lingual lesion.

Once the main diagnosis—exclusion of malignant disease—has been established, the secondary diagnosis of the actual nature of the non-malignant condition can be arrived at with fair ease and accuracy. In treatment the following principles should be remembered: (1) The "silver nitrate pencil" has caused more cancers than it has cured benign lesions, and caustics should never be applied. (2) Teeth, if not absolutely sound, are better sacrificed. (3) General principles of therapeutics are applicable to the tongue. (4) Surgery has found in recent years helpful therapeutic aids in diathermy, heliotherapy, radium and X-rays. (5) Attention to general health is important. (6) The use of vaccines, autogenous or otherwise, has been the cause of delay in adequate treatment and has proved in the mouth a surprising failure.

THE SALIVARY GLANDS, IN AS FAR AS THE MOUTH IS CONCERNED

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THE multiplication of instruments and apparatus designed to reveal hidden pathological conditions sometimes makes the practitioner lament that he lacks facilities for special examination. In the case of the mouth this is certainly not true. Seated in his consulting room, armed with little more than an electric torch and a spatula, he can, if he will, become a master of intra-buccal living pathology and diagnosis, for his opportunities are unrivalled. Viewed from this angle, examination of the various integrant parts of the buccal cavity is imbued with greater interests, not the least of which, in relevant cases, is the scrutiny of the salivary apparatus. The secretory organs which discharge their products into the mouth are numerous; there are the parotid, the submaxillary, and the sublingual glands, the gland of Blandin and Nühn, the palatal glands, the molar glands, and a myriad of small mucus-secreting units dotted over the floor of the mouth and the buccal aspect of the cheek. This article deals with the diseases of these glands in so far as they affect the mouth.

SUBMAXILLARY SALIVARY CALCULUS

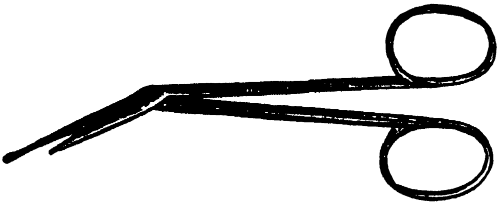
Wharton's duct and the submaxillary gland are by far the commonest sites for a salivary calculus. It is remarkable that this condition often remains undiagnosed for long periods. There are various clinical types: (*a*) *A swelling in the submaxillary triangle* is often a leading feature (Fig. 1). Enlargement of the gland before or during meals is pathognomonic of the condition:—

A barber, aged 61, for forty years had noticed a swelling in the right submaxillary region. "Most noticeable after eating gooseberries, or anything tart." For four months the swelling had been larger and very painful. A large salivary calculus was removed from the posterior portion of Wharton's duct.

(*b*) *Salivary colic* typically occurs at the commencement of a meal. The pain is often severe, is described by the patient as "like tooth-ache," and on this account he is liable to be referred to the dentist. (*c*) *The patient complains of "something under the tongue."* When the offending object is a calculus, it usually means that the stone is impacted in the ampulla of Wharton's duct, or is partially extruding therefrom. (*d*) *As a cause of lingual neuralgia:* The lingual nerve passing to the tongue hooks around Wharton's duct, consequently the pain caused by a stone is sometimes referred. The pain is described by the sufferer as "shooting down the side of the tongue."

Physical examination.—Inspection: A piece of dry gauze is inserted under the tongue and the patient is given a small section of lemon to suck while he keeps the gauze in place with his finger. He now opens his mouth, and rotates the tongue upwards and backwards. The gauze having been removed, the dried floor of the mouth is inspected in a strong light. Saliva can be seen flowing and occasionally being ejected from Wharton's ducts. In the case of an impacted calculus there will be little or no secretion from the affected side; possibly a stone can be observed actually shining through the mucous membrane (Fig. 2). When secondary infection has supervened, the ampulla is inflamed or pus can be seen exuding. *Palpation:* The submaxillary gland consists of two parts, a buccal and a cervical. An enlarged submaxillary lymphatic gland has no intra-buccal extension. It is therefore possible to differentiate between an enlarged submaxillary salivary and an enlarged submaxillary lymphatic gland by bimanual palpation (Fig. 3). After the gland has been palpated, the fingers are moved forward and the whole course of Wharton's duct is examined systematically. By this means it is often possible to diagnose with precision a calculus located within the more hidden (posterior) reaches of the duct. *Radiology:* In difficult cases where the stone, or stones, are situated within the gland itself, X-ray examination does not reveal them regularly. Stones in Wharton's duct as a rule show well, but so accurate is physical examination in this situation that the X-ray becomes a matter merely of academic interest.

Treatment.—The chances of the stone passing naturally are too remote to justify an expectant attitude. In the case of a calculus in *the anterior two-thirds of Wharton's duct*, removal of the stone is simple. The floor of the mouth is infiltrated with a little 1 per cent. novocaine, and the duct is slit up.



Probe-pointed scissors for slitting up Wharton's duct.

The probe-pointed scissors which I designed for this purpose facilitate the manœuvre. Once the duct is laid open, the calculus can be extracted with ease. Relief is immediate, there is hardly any bleeding, and a simple mouth-wash is the only after-treatment necessary. The removal of a stone from *the posterior third of Wharton's duct* is more tedious. Not only is this region less accessible, but a stone here has an irritating way of slipping back into the gland and out of reach just as everything is ready for its removal. It is therefore as well to explain to the patient that the submaxillary gland may have to be removed, and to have the area prepared in case this step should be necessary. Even in this situation the operation can be undertaken under local anæsthesia. The duct is slit up in the usual manner. Pressure is then exerted on the submaxillary gland by fingers of the left hand from without. If the stone is not extruded readily, the gland is pushed well up and a small hollow scoop applied behind the stone. Alternatively, the calculus having been "fixed" by a sterile bent pin applied behind it, it can be extracted through a longitudinal incision directly over the stone. *Extirpation of the submaxillary gland* is indicated when there is a calculus or calculi within the gland, in cases of recurrent calculi, when chronic inflammation of the submaxillary gland persists after removal of the stone which caused it, and in cases of stricture of Wharton's duct unrelieved by slitting. The best incision is one parallel to the mandible, half an inch below its inferior border. On sixteen occasions I have removed the gland for calculi or their aftermaths by this route. In every instance the result has been pleasing and the scar almost invisible.

RANULA

Simple ranula.—Simple ranula is a clinical entity. When the patient opens his mouth and lifts up the tongue a *transparent* cystic swelling can be observed. Tortuous veins can be seen traversing over it, and at one point near its apex the buccal mucous membrane seems to be deficient, as though the cyst was bursting through its coverings. An opaque strand can often be made out coursing over the wall—this is Wharton's duct, which is displaced, but takes no active part in the pathological process (Fig. 4). Pathologically, a simple ranula should be regarded as a myxomatous degeneration of a mucous gland. The gland at fault may be the sublingual, the gland of Blandin and Nühn, or one of the solitary glands studded over the buccal mucous membrane. The gland of Blandin and Nühn is a variable structure which is sometimes situated further down the inferior surface of the tongue. I have observed an example of myxomatous degeneration of this gland in its alternative position (Fig. 5).

The treatment of simple ranula.—In looking through the notes of thirteen cases of ranula in my possession, I find that five had been previously operated upon for this condition, some two or three times. Probably simple incision, which is useless, had been practised. *Complete excision :* A difficulty in ideal treatment is that the cyst bursts before dissection can be completed. If some of the fluid within the cyst can be aspirated before commencing enucleation, complete dissection is usually possible. Often, however, the contents are of the consistency of jelly and will not flow through a hollow needle. *Partial excision with marsupialization :* A portion of the cyst wall is removed. The free edge of the resulting cavity is united to the buccal mucous membrane throughout its circumference by fine catgut sutures. Whichever method is practised, it is necessary to preserve the integrity of Wharton's duct. I recorded a case where this structure was occluded during an operation for a ranula, causing the submaxillary salivary gland to swell up to an enormous size.

Deep or plunging ranula.—There still remains a group of cases which from the mouth appear to be typical ranulæ, but if the neck is examined a cervical prolongation will be found continuous with the intrabuccal one. J. E. Thompson seeks to explain the riddle of these cysts by stating that they are derived from the cervical sinus; at any rate, this hypothesis furnishes a logical basis for adequate surgery. This type of ranula must always be attacked through the neck.

AFFECTIONS OF THE MINOR ACCESSORY SALIVARY GLANDS

Retention cysts of the buccal mucous glands are seen from time to time (Fig. 6), and they can be dissected out under local anæsthesia readily. The molar glands are four or five in number. They lie on the outer side of the buccinator, their ducts piercing that muscle to open into the vestibule of the mouth. There are structurally similar glands situated in the palate. Any of these minor accessory glands may give rise to a retention cyst, and what is more important a mixed tumour, similar to the well known parotid tumour, can develop within them.

THE PAROTID, WITH SPECIAL REFERENCE TO THE ORIFICE OF ITS DUCT

Stenson's duct opens opposite the second upper molar tooth. To revert to my original thesis—with the aid of a spatula and a torch the interesting phenomenon of the secretion of parotid saliva can be observed by anyone who takes the trouble to look. Bacterial infection of the parotid is common; calculus formation here is rare—at least fifty times rarer than in the submaxillary salivary gland. On many occasions I have been enabled to make a diagnosis of subacute or chronic parotitis by observing the orifice of Stenson's duct in a good light. Gentle pressure now exerted over the gland will often cause a gush of purulent saliva to be ejected, and the diagnosis, which up to that time is often in doubt, becomes indisputable (Fig. 7). This simple demonstration, which can be repeated by the merest tyro, has so enthralled onlookers that I am encouraged to draw attention to it here.

Treatment.—In cases of *early acute and subacute parotitis,* abortive treatment should be pursued energetically. The mouth must be kept scrupulously clean by mouth-washes and frequent swabbings with boroglycerol. A sialogogue in the form of chewing-gum is useful. W. Meyer finds that infections of the parotid gland respond exceptionally well to hyperæmia, and he induces artificial hyperæmia by placing an elastic band around the neck. The band is worn for as much as ten hours per diem.

Very brief reference only will be made here to *acute suppurative parotitis.* If the patient does not respond quickly to the measures outlined above, on no account should the clinician await fluctuation, for pus may lie deeply beneath the parotid

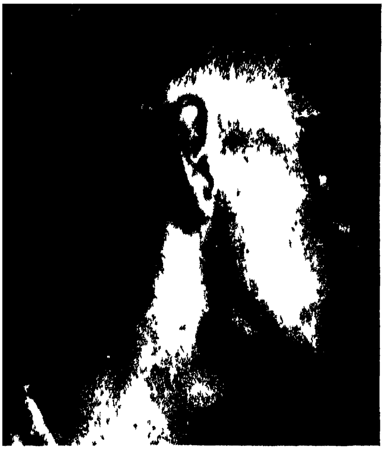


FIG. 1 Enlargement of the submaxillary salivary gland, due to a calculus in Wharton's duct (Reproduced by permission from A Short Practice of Surgery, by Bailey and Love London Messrs H K Lewis & Co)

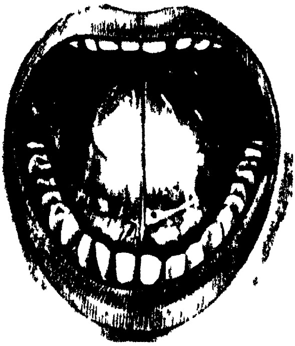


FIG. 2 Stone in the anterior third of right Wharton's duct

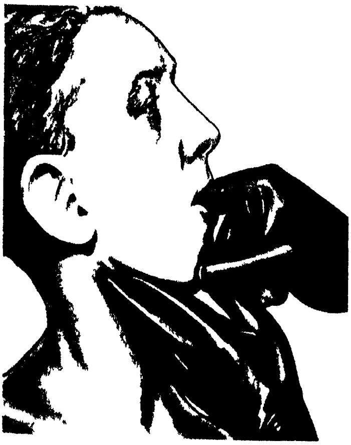


FIG. 3 Bimanual palpation of the submaxillary salivary gland

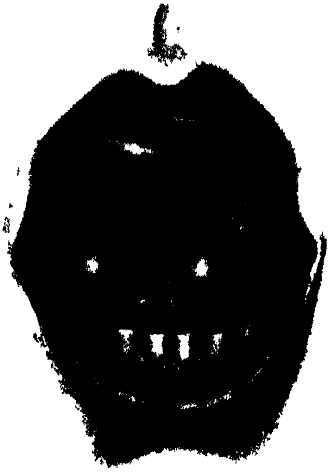


FIG. 4 A large ranula invading both sides of the floor of the mouth, but mainly confined to the left Wharton's ducts can be seen traversing over the swelling (Reproduced by permission from *The British Dental Journal*)

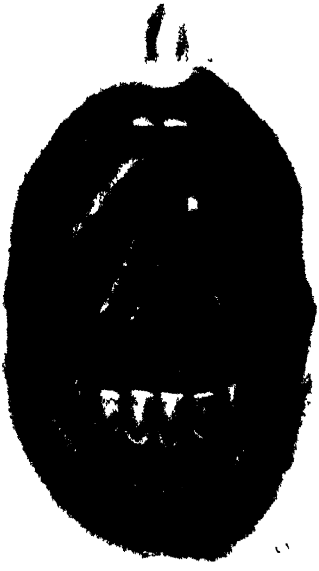


FIG. 5 Myxomatous degeneration of the gland of Bland and Nuhn (Reproduced by permission from *The British Dental Journal*)

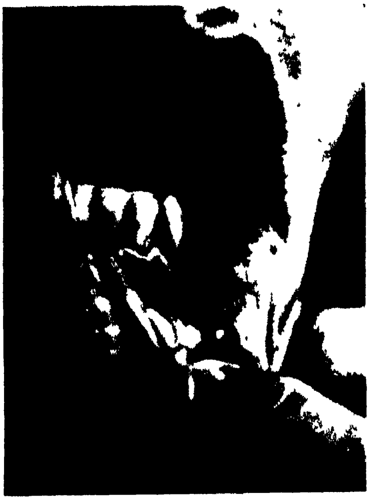


Fig. 6.—A retention cyst of buccal mucous gland.

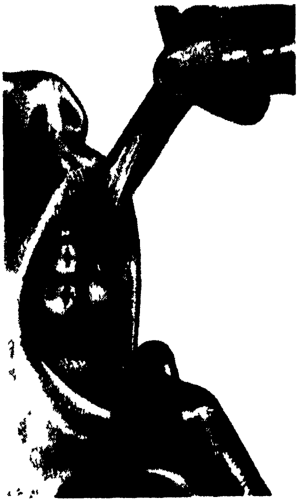


Fig. 7.—Pus exuding from the orifice of Stenson's duct, in a case of chronic parotitis.

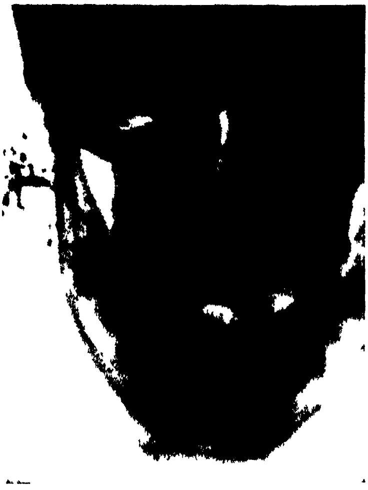


Fig. 8.—Sialogram in a case of chronic parotitis.

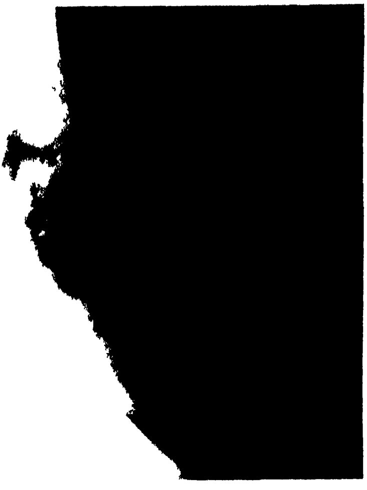


Fig. 9.—Sialogram in a case of parotid tumour.

fascia. Instructions for opening a parotid abscess are well known, but the effective method designed by Blair for decompressing the whole parotid in fulminating parotitis will stand reiteration. The incision is made in front of the ear. It is a long incision extending from the zygoma to the angle of the jaw. It passes down to the parotid fascia. The anterior edge is undercut and pulled well forward, thereby exposing practically the whole of the parotid gland. The capsule is incised transversely, if necessary in several places. If pus does not flow, blunt-nosed forceps are thrust within and their jaws opened. The method spares the facial nerve and allows a virulently inflamed parotid room to expand. The wound is left open.

Chronic parotitis is likely to be resistant to treatment, even when necessary dental treatment and measures akin to the abortive treatment of subacute parotitis have been instituted. Catheterization of Stenson's duct is a simple measure which can be carried out in the consulting room. With a fine, sterile ureteric catheter the punctum can be entered and the duct catheterized. Catheterization of Stenson's duct has several uses; it helps to eliminate the possibility of a parotid calculus; in chronic cases of parotitis resistant to other methods of treatment I have used the method, combined with an injection of 1 per cent. mercurochrome down the catheter, and the results have been most encouraging. Another use of catheterizing Stenson's duct is to obtain a sialogram, which occasionally elucidates an otherwise obscure diagnosis. A diluted solution of lipiodol can be injected easily through the catheter, and an enlightening X-ray picture of the parotid tree is obtained thereby (Figs. 8 and 9). Useful as are these, and kindred diagnostic adjuvants, they are of comparatively minor importance. Pride of place should usually be accorded to clinical methods, and this is true particularly in diseases of the mouth.

CONGENITAL DEFORMITIES OF THE MOUTH

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THERE is one congenital deformity of the mouth so much more common and more important than any other that it alone need be considered in any short account of the subject. It is a failure of junction between the fœtal parts that should form its upper wall, in a complicated but continuous line of fusion running through five quite distinct regions. These regions are the lip, the floor of the nostril, the alveolar ridge, the hard palate, and the soft palate; they present five quite distinct problems to the surgeon.

It is not easy to give a concise summary of the surgery of this deformity, because this is one of those regions of the body the anatomy and physiology of which have not yet been worked out. For instance, in closing a cleft lip, in which the only consideration is appearance, it is a fairly obvious platitude that the best way to do it would be to imitate the process of formation that should normally have occurred. But a search for any rational account of this process of formation in the current textbooks of anatomy is quite fruitless. Again, the only object of operating on a cleft palate is to enable the patient to shut off his mouth from his nose at will; but so far surgeons have not bothered to work out the way in which this action is normally performed before operating to enable it to be done. Once, however, these fundamentals of the problem are stated, the actual technique of treatment becomes merely a matter of applying to them the general principles of surgery in order to obtain the best results. It is on these lines that the present summary is made.

THE CLEFT OF THE UPPER LIP

The first step in determining the normal process of formation of the lip is to examine its component parts as they are left when fusion has totally failed; that is to say, in a complete double cleft (Fig. 1*a*). There is on either side a thick fleshy prolongation of the cheek and its muscles, while between these lies a rounded central portion, thinner from back to front and shorter from above downwards. If the lateral processes are pushed inwards forcibly, their prominent lower angles can be made to meet below the central portion. Similarly in a single cleft, the axis of the gap is never exactly vertical, but always slants inwards as well as downwards (Fig. 2*a*).

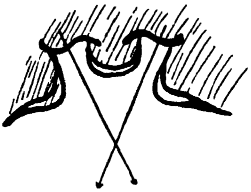

FIG. 1*a*.

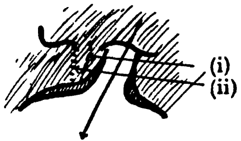

FIG. 2*a*.

1*a*. Complete double hare-lip, showing how the lateral processes are invariably longer from above downwards than the central portion, and how the axes of the clefts slope inwards.

2*a*. Single complete hare-lip, showing the cleft of its floor, the spreading of the nostril and the inward slant of axis of cleft. (i) The faint scar of the junction between the two globular processes to form the central portion. The meeting of this scar and the muco-cutaneous line gives the point for the trephine hole. (ii) The ridge showing the overlapping of the lateral process over the central portion on the sound side.

Let us picture what must happen during fœtal life when the lateral processes grow in towards the central portion. They must first touch above owing to their curved outlines, so that fusion would begin just below the nostril. But the lateral processes are much thicker than the central one, so that where they meet it they must overlap it and cause a ridge. As the process of fusion goes on, this overlapping increases, so that the ridge moves inwards, the extent of this inward movement being, of course, greatest above, where the processes first met. But just as the greater thickness of the lateral processes makes them override the central portion at its sides, so does their greater length make them curl round it below, till they meet each other in the mid-line and fuse together.

The consequence is that the line of fusion on the outer or skin surface is shown by two ridges, formed by the overriding of the lateral processes over the central one. These ridges approach each other most closely above, where the overriding first began, diverge gradually till the lower limits of the central portion are reached, and then rapidly approach again as the lateral processes swing round the lower end of the shorter central portion. On the inner or mucous surface any overriding would be prevented by the underlying alveolar ridge, so that the line of fusion would simply outline the shape of the central portion.

If now, having deduced the formation of the lip in the abstract, we examine the newly formed lip of a baby, we find considerable confirmation of this hypothesis (Fig. 1*b*). The ridges that define the philtrum,

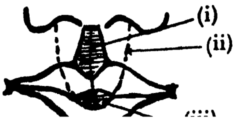

FIG. 1*b*.

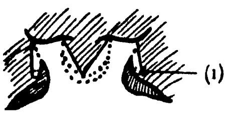

FIG. 1*c*.

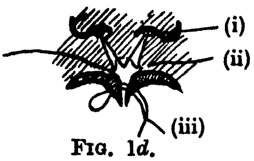

FIG. 1*d*.

1*b*. Diagram of the formation of the normal lip. (i) The skin surface derived from the central portion, the rest of it being overlapped by the lateral processes. (ii) The line of junction showing as a scar on the mucosa. (iii) The central papilla of the lip, showing how it is formed by the apex of the line of junction of the mucosa.

1*c*. Complete double hare-lip cut ready for suturing. (i) Trephine hole connecting the two chisel cuts in the lateral process.

1*d*. The suturing of a complete double hare-lip. (i) The sutures joining the floor of the nostril. (ii) The suture joining the apex of the central portion and the two trephine holes. (iii) The mattress suture everting the tags of red margin cut from the lateral processes.

diverging as they descend and then suddenly converging again to meet in the handle of the "Cupid's bow," are familiar to everyone both in life and in art. But the best proof of all is a marking that appears to have been overlooked, perhaps because it fades in later life, though it is almost invariable in the newly born. If the lip is everted to show the mucosa, a distinct furrow in it will be seen enclosing a shield-shaped area exactly corresponding to the central portion. Only the apex of this shield appears in the ordinary view of the lip, and here it forms the central papilla that is sometimes so marked in young babies as to lead the parents to seek advice about it.

To sum up, the only skin belonging to the central portion of the lip which survives in the normal lip is that flooring the groove between the two ridges formed by the overriding lateral processes. No part of the red margin is formed by the central portion, as the lateral processes swing round to meet below it. The central papilla of the lip is the apex of the area of mucosa belonging to the central portion, defined by the scars of fusion between it and the lateral processes. (Similar scars can often be seen running outwards in the mucosa of the young, along the lines of junction from the corners of the mouth.)

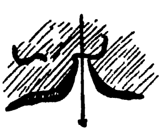

Fig. 2*b*.

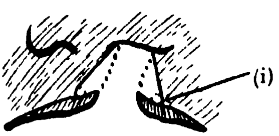

Fig. 2*c*.

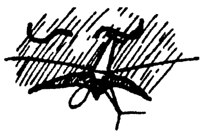

Fig. 2*d*.

2*b*. Typical textbook drawing of a single cleft, showing no inequality of nostrils and a vertical axis to the cleft.

2*c*. Single hare-lip cut ready for suturing. (i) The lateral trephine hole.

2*d*. Suturing of single hare-lip, showing mattress suture everting tags of red margin, and suture joining trephine holes.

Reduced to the simplest form then, the lines of junction of the elements of the lip are not the two vertical lines from the nostrils of the anatomy books, nor are they the Y-shaped junction of the classic operations for double hare-lip. They are in the shape of a V, with its apex on the centre of the muco-cutaneous line, and leading downwards from this, the single median junction of the red margin. I believe that every cleft, double or single, complete or incomplete, can best be joined on this single formula, the only difference between a notch of the red margin and a complete double cleft lying in the amount of this V-shaped join that is cut out and sutured. I am emboldened in thus departing entirely from the classic incisions by noting that the notorious faults of the results they give are exactly what might be expected from their divergencies from this formula. For instance, the ape-like lengthening and tightening of the upper lip, which is the familiar and unhappy result of the classic operation for double clefts, could be reproduced by cutting a normal lip apart on my formula, and then stitching it together again on the Y-joining of the textbooks.

Treatment.—If the edges of the cleft as they stand were simply made raw and joined together, the junction would be satisfactory enough except for the lower edge of the lip, where the meeting of the two curves would leave a notch. To avoid this notch it is obvious that the full red margins on either side have to be turned outwards, one against the other. This implies a sudden change of direction in the line of incision, an angle that will make it difficult to get perfect apposition when it is sewn to a corresponding angle on the other side. For some years now I have been eliminating this angle, which is both difficult to cut and to suture, by converting it into a curve, cut by a 2 mm. ophthalmic trephine. At the selected points on the muco-cutaneous line this trephine is driven through the lip on to a slip of soft wood held below. The rest of the incisions, all straight lines, are then cut out by means of a razor-sharp, half-inch broad chisel-knife, thrust through on to the same slip of wood without pausing to make any further measurements or adjustments. The result of this is two perfectly straight, square-cut raw edges through the skin, with at their lower corners hooked tags of red margin (Fig. 1*c*). The first step in suturing is to turn these tags outwards against each other by means of a mattress suture passed through them (Fig. 1*d*). This is tied tightly, without fear of scarring, which does not show in mucous membrane.

Then the two ends of the muco-cutaneous line are accurately adjusted, this being done not by identifying them, which may be curiously difficult to do while their colour is obscured by tension and bleeding, but by sewing each trephine hole to the other. As these holes have been made in exactly the same relation to the muco-cutaneous lines, it follows that their meeting means the meeting of these lines. The skin is then joined by minute stitches, usually three of them. Last of all the mucosa is carefully joined by some half dozen stitches beginning from below, using an artery forceps hung on each suture to evert the one immediately above it, and the operation is complete.

FIG. 1*e*.

FIG. 1*f*.

1*e*. Complete right and incomplete left cleft of the lip.

1*f*. Same case as *e* ten days after operation, untouched photograph. Note shortness of lip from above downwards, looseness of red margin, and correction of spreading of the right nostril. The stitch scars have already almost disappeared. If this lip had been treated by the classic incisions it would have been about twice as long from above downwards, and extremely tight across.

The dangers to healing are three—tension, the action of the mucus of the nose, and sepsis. Tension can be overcome completely by the use of a modified form of Logan's bow, in which the weak point of the original model, its lack of adaptibility to slipping of the plaster, is overcome by so placing the spikes that hold the plaster that this can easily be tightened or slackened. Nasal mucus, however unirritating in its proper place, is corrosive to the skin, and will infallibly prevent proper healing if allowed to run over the wound. The prevention of this is a matter of nursing. A small loosely rolled pledget of cotton-wool is placed in the nostril, and changed as soon as it becomes soaked, even if this means every half hour throughout the twenty-four. It must be clearly understood that this cotton wool is not acting as a plug, but like a piece of blotting-paper. Skin sepsis can be entirely stopped by using an ointment of one part flavine to a thousand parts of liquid paraffin over the wound, applying a small quantity every day or so.

The result of these measures, the microscopically exact joining of two perfectly clean-cut surfaces, the avoidance of tension from the muscles, of skin irritation by mucus, and of sepsis, should be primary union in every case without exception. There is not any point in removing the skin stitches very early, as the complete absence of tension on them prevents them from cutting the skin and so marking it; I usually remove them on the sixth day; a year afterwards their marks can only be seen on close inspection in a strong light.

THE CLEFT OF THE FLOOR OF THE NOSTRIL

It is remarkable that this part of the deformity is never mentioned in works on the subject, with the sole exception of those of Veau. It is very rare indeed to find a cleft of the lip in which the faulty junction does not extend into the nostril, though this degree of the failure may vary from a mere widening and thinning of the floor to a complete cleft a third of an inch across. It should be treated exactly as is the cleft of the lip, by excising the widened floor where there is no actual cleft; and when there is one, by making a raw area on the septum and sewing to it the raw surface that has been detached from the bone of the cheek on the outer side of the cleft (Fig. 3). The raw area on the septum should be carefully chosen to run as the floor of the nose should normally have done, straight backwards at right angles to the plane of the lip. However well the lip is joined, if a cleft of the floor of the nostril is left, it will, though invisible itself, cause a very ugly widening of the nostril on that side. It is here that the art of the retoucher in photographs of results after operations is most often employed.

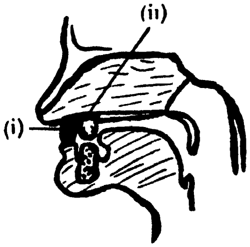

FIG. 3.

3. Diagram of cleft of the floor of the nostril. (i) Raw surface of cleft of the lip. (ii) Raw surface on septum, made in the normal position of the floor of the nostril, running horizontally backwards in contrast to the vertical junction of the lip.

THE CLEFT OF THE ALVEOLAR RIDGE

The two lines of junction in the alveolar ridge pass to either side of the premaxilla, and if fusion fails here a most peculiar factor enters into the problem. This is the formation of new bone in front of the suture-line between the vomer and the premaxilla, so lengthening the lower border of the septum antero-posteriorly and thrusting the central piece of the alveolar ridge forward. It is to me entirely inexplicable why this should occur. The suture line takes on almost the look of a miniature growing end of a limb bone, becoming swollen and vascular, though microscopically there is nothing corresponding to an epiphyseal cartilage. If only one side of the premaxilla is freed by a cleft, its displacement is limited to a swinging forward of the free edge, but if both sides are free it is pushed straight forward to lie just below the tip of the nose (Fig. 4*b*, Fig. 4*c*).

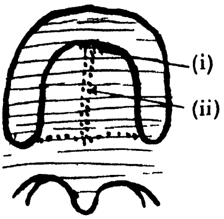

FIG. 4*a*.

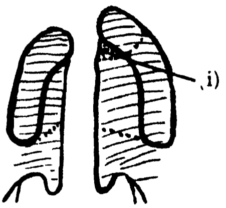

FIG. 4*b*.

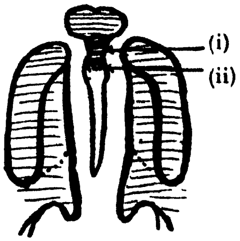

FIG. 4*c*.

4*a*. Diagram of a normal hard and soft palate. (i) The suture-line between the vomer and the premaxilla. (ii) The line of the lower edge of the vomer.

4*b*. Unilateral cleft of the palate and alveolar ridge. (i) Position of new bone which has forced the free edge of the premaxilla forward.

4*c*. Cleft of the palate with bilateral cleft of the alveolar ridge. (i) New bone, formed between the premaxilla and the vomer, pushing the premaxilla forward. (ii) Suture line at anterior end of vomer, in normal position.

Treatment.—Unilateral swinging forward in a single cleft will be corrected by the pull of the lip muscles once these are joined over it, and nothing need be done about it. But in the complete forward shifting of the premaxilla permitted by a double cleft of the alveolar ridge, the simple joining of the lip over it has a disastrous effect in invariably pulling the two lateral parts together behind it, leaving it out in front to support an extremely ugly snout-like profile.

The solution is to remove submucously with biting forceps the new bone that has formed, that between the suture line, which is always in its normal position, and the back of the premaxilla. Then the sides of the cleft are made raw, and the premaxilla is thrust back and held in position for three weeks with a lead plate, sewn to the alveolar ridge and the septum by bronze wire. At the end of this time junction should be firm, and will become firmer in a year or so. The method usually recommended of taking a wedge out of the middle of the lower edge of the septum is thoroughly bad, as it wrecks the foundations of the bridge of the nose, and leaves the premaxilla still supported by an entirely abnormal piece of bone.

THE CLEFT OF THE HARD PALATE

Any cleft of the hard palate can be joined by cutting the muco-periosteum free from the bone and the alveolar margin, and sliding it inwards and upwards till it meets the corresponding flap on the other side. The raw surface that has been in contact with the bone on the edges of the cleft is everted against the corresponding opposite part, for a quarter of an inch or so. Nothing, of course, will stop any method of mid-line junction of the parts of the cleft palate being referred to as a Langenbeck's operation, but this method of sliding the flaps inwards and upwards is completely different from Langenbeck's method of swinging them downwards, leaving them fixed to the alveolar ridge on their outer side. This had the two disadvantages of giving a very limited range of inward movement, dependent mainly on the angle of the sides of the hard palate, and of leaving a vast raw area on the top of the joined flaps, which by its contraction when cicatrizing drew the soft palate upwards and backwards away from the back wall of the palate. Veau's method of joining the nasal mucosa as well as the oral muco-periosteum is an attractive and logical idea, though personally I have not made up my mind about its value.

THE CLEFT OF THE SOFT PALATE

From a reasoned consideration of the action of the muscles in this region, which can have no other function than that of controlling the passage they surround, it becomes clear that the simultaneous contraction of all those supplied by the pharyngeal plexus will produce a contracting ring opposite the middle of the soft palate, a ring which rises as it closes in the manner of the sphincter ani. The only muscle with a different nerve supply, the tensor palati, acts, as might be expected, in opposition to this sphincter, opening it by pulling its anterior half away from the posterior. If having reasoned out this action in the abstract, we desire to confirm it in the concrete, it is easy to do so. The first experiment, which seems to have been neglected by all writers on this subject, is to look into the mouth of someone saying "Ah." It will be seen that though the nose is shut off from the mouth, the *edge* of the soft palate does not touch the pharyngeal wall as it is represented to do in all illustrations. The second is to pull up the uvula of a patient gagging under an anæsthetic, and watch the sphincter contract into a perfect ring. The third is to pass a soft rubber catheter down the throat through the nose, and observe that

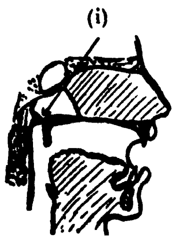

FIG. 5a.

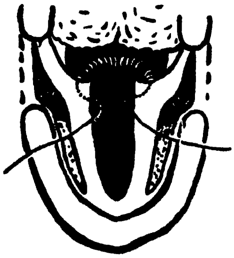

FIG 5b.

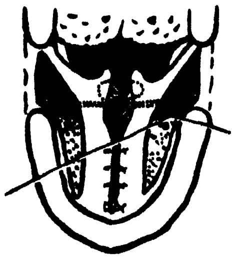

FIG. 5c.

5a. Diagram of the closing of the naso-pharynx, showing the position of the sphincter. The posterior half of it is known as Passavant's ridge. (i) Line of closure.

5b. Diagram of the insertion of the circular suture in the line of the sphincter which is recommended. It can be seen entering the raw surface of the soft palate, passing completely round the pharynx under the mucosa, and emerging through the raw surface of the opposite side.

5c. Diagram of the suturing of the ends of the tensors of the palate. The circular suture has been drawn tight and knotted, and its ends passed round the tendinous expansion of the tensors on either side. It will be drawn tight and knotted in its turn, taking all strain off the sutures that adjust the mucosa.

as one swallows it is caught by the rising sphincter and forced a quarter of an inch or so upwards out of the nostrils. Passavant's ridge is simply the back half of this sphincter.

Treatment.—This is not a plastic problem, concerned with appearance, but an orthopædic one, concerned with the functions of muscles. Accordingly these muscles of the sphincter, which have to be joined together, must be treated, in defiance of classical surgery, as they would be in a similar case elsewhere in the body. The ends of the ring on either side of the gap must be detached from the structures external to them by a cut along the pterygo-mandibular raphe, bringing away with them the hamular process upon which the tensor palati is hung. This allows them to meet easily, but the difficulty is to keep them in apposition long enough for healing to occur in a region that can be kept neither clean, dry, nor still. I have lately been using a device of which I have considerable hopes, though whether or not it will give the hundred per cent. of complete joins secured by the use of Logan's bow on the lip is a matter for the future to prove. It consists in the passing of a purse-string suture round the entire sphincter, just deep to the mucosa, and emerging through the raw areas of the soft palate that are to be sewn together on either side. This suture is inserted by means of a five-eighth circle needle carrying 40 day No. 1 catgut, passed as soon as the edges of the cleft have been rawed, and tied as soon as the nasal mucosa has been sutured. It narrows the naso-pharynx as much as the surgeon considers to be advisable; I suggest to a diameter of a quarter of an inch or so; then, after it has been knotted, another somewhat similar ring suture is made with its two ends, which are passed outwards into the cut that has freed the sphincter on either side. There they pick up the tendon of the tensor palati, and finally are pulled tight and knotted to bring these tendons (and with them the other elements of the sphincter) closely together. It is almost impossible for the purse-string suture to cut out, as the tension is distributed over the entire circumference of the pharynx; while the hold of the loop that joins the muscles is very secure in the tough fibrous tissue into which the tensor palati expands. The pharynx is narrowed, but not by interfering with its quite normal back half as in Wardill's operation; and the muscles are joined, but not blindly and under tension as in Veau's *suture musculaire.* Altogether I believe this device to have sufficient advantages both in theory and practice over any other means of joining the soft palate to justify this preliminary mention of it.

A palate joined in this way can be seem to move freely during the first week after operation, when the patient is made to say " Ah," and there is not any need for special precautions in nursing. The final step in treatment is to teach the patient the proper use of his new mechanism by means of lessons in voice production.

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STOMATITIS

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STOMATITIS, or inflammation of the oral mucosa, is almost always an infective process, and considering the teeming mass of organisms normally present in the mouth and the liability of the buccal mucosa to injury, it is surprising that it is not of more frequent occurrence. The two factors which prevent it are an intact mucous membrane, and the resistance of the subject. These must give way before a general infection of the mucous membrane of the mouth occurs. A breach of the mucous membrane may be made by injury, e.g. by the tooth-brush, by biting on the flap of gum over an impacted third molar, or by the chronic gingival inflammation in unclean mouths. The following types of stomatitis are generally recognized: Catarrhal, Follicular, Aphthous, Parasitic, Ulcerative, Gangrenous, and that due to drugs.

CATARRHAL STOMATITIS

This is a simple catarrh occurring mainly in young children improperly fed, usually accompanied by similar inflammation of the nose and throat and often associated with one of the exanthemata. In adults it may be caused in susceptible persons by the excessive use of tobacco or alcohol. The mucous membrane is red, glazed and swollen. The tongue is swollen and furred, taste is impaired, the breath foul, and salivation is profuse. The gums are pale and swollen, but rarely bleed. There is discomfort in eating, but no real pain.

Treatment.—Give food cold or luke warm. Use a mouth wash of potassium chlorate 2 per cent. or a saturated solution of borax.

FOLLICULAR OR HERPETIC STOMATITIS

This condition occurs more frequently in children, but is not uncommon in adults. It is usually associated with intestinal disorders, coryza, or acute infections, such as the exanthemata, malaria, or pneumonia. Vesicles occur varying in size from a pin's head to a pea, chiefly on the lip and especially at the angle of the mouth, but they may occur on the inside of the lip, or cheek, or even on the tongue. The vesicles dry up leaving a crust which, if removed, is apt to recur.

Treatment.—Apart from the appropriate treatment for the associated general condition, the scabs should be removed by softening with warm water and the spots treated with spirits of camphor, or dusted with finely powered burnt alum applied with a camel-hair brush, or touched with silver nitrate. A very effective and less drastic local application is the following :—

℞	Ac. salicyl. - - - - - -	gr. xxv
	Phenol. - - - - - - - -	♏ xv
	Bismuth. subnit. - - - - -	ʒi
	Adeps lanal. - - - - - - -	ad ℥i

APHTHOUS STOMATITIS

This variety most often occurs in children at the first dentition, but it is not uncommon in adults and then is frequently due to injury with the tooth brush. Small white spots or patches appear which are extremely sensitive and break down at once into very painful ulcers. They may occur on the mucous membrane of the cheeks, or in the buccal sulcus, or under the tongue.

Treatment.—Give a potassium chlorate mouth wash. In children paint with tincture of myrrh or glycerine of borax. In adults touch with pure silver nitrate; sometimes this does more harm than good. Relief can be obtained by drying and dusting before and after meals with boro-chloretone, but probably the method which gives the greatest relief and quickest healing is the use, when possible, of a small swab of wool soaked in glycerine and placed over the ulcer for several minutes at frequent intervals, especially before and after meals.

PARASITIC STOMATITIS

Thrush occurs only in the very unclean mouths of debilitated children and cachetic adults. It is due to a fungus (*Oidium albicans*). It is most commonly met with in infants during the first two months of life and is usually associated with gastro-intestinal disorders. Acid fermentation of carbohydrate food remnants leads to a catarrhal stomatitis which provides a fertile ground for the growth of the fungus. Prevention is assured by scrupulous cleanliness of the feeding utensils and thorough, but very gentle, cleaning of the mouths of babies and sick adults with wool swabs. It commences as small white spots usually on the tip of the tongue and inside the lips; these may coalesce into patches and even occasionally spread over the whole oral mucous membrane. In appearance it resembles milk curd, but can be distinguished by the fact that it is adherent and that if peeled off it leaves an abraded surface. In an early stage it might be confused with aphthous stomatitis, but in the latter there are yellowish white depressed ulcers which are very painful and salivation is profuse; whereas in thrush the pearly white patches are raised and painless and the mouth is very dry. The diagnosis may be established by microscopical examination of a portion of the growth macerated with liquor potassæ. There is a little local discomfort with some pain on swallowing or sucking, but symptoms otherwise are due to the conditions of health preceding it.

Treatment.—When the primary condition of impaired nutrition is improved the thrush disappears by itself. The patches may be treated with a solution of sodium sulphate (ʒi to ℥i) after which the fungus can be scraped off easily, but too vigorous handling of the mouth should be strictly avoided as it may cause further injury to the inflamed mucosa and extend the infection, and it is usually wiser to wipe the mouth out very gently before and after a feed with wool soaked in glycerine of borax, or potassium permanganate 1 in 1,000, or give gauze tampons soaked in glycerine of borax to suck, or a little boracic powder and saccharine. Errors of diet must be corrected and feeding utensils must be boiled.

ULCERATIVE STOMATITIS

This condition, also known as ulcerative gingivitis or Vincent's disease, is much more prevalent than is generally supposed. It occurs occasionally in children, but much more often in adults, usually in unclean mouths; but it may occur in patients with only slight gingival inflammation and it has been reported in mouths without any previous pocketing or gingivitis whatever. A debilitated state of health predisposes, but is not by any means invariable. The two organisms always found in the acute stage are the *Bacillus fusiformis* and the spirillum of Vincent, both anærobes. When the disease has become rather chronic, as it usually does when allowed to pass undiagnosed, these organisms will be swamped by the normal mouth bacteria. It has been said that Vincent's infection is an acute disease, and that chronic Vincent's infection does not exist. This is a dangerous doctrine and most certainly untrue. Vincent's disease is exceedingly often unrecognised and undiagnosed, being regarded as merely pyorrhœa and then usually under inappropriate and inadequate treatment lapses into a chronic condition. The fusiform bacilli and spirochætes continue to thrive in gum pockets especially favourable to their growth, and at intervals, governed possibly by the variable resistance of the host, are liable to produce fresh acute attacks. The infection should not be considered eradicated until smears taken from *all* parts of the gingival areas are negative. An infected flap of gum over an unerupted and impacted lower third molar is the commonest cause of the disease and gives rise to the most severe forms. It is definitely contagious, as was demonstrated most markedly during the war when, its correct pathology being at first unrecognized, it was given the name of " trench mouth."

It is characterized by a necrotic ulceration of the gum margins. The gum is much swollen with a whitish membrane at its edge and bleeds very readily. It may be localized in the region of primary infection, but generally spreads rapidly round the gum margins and may involve the whole of both dental arches and spread by contact on to the mucous membrane of the cheek or lips with the formation of sloughy ulcers. If unchecked it may lead to loss of the teeth with a superficial necrosis of the jaw. Not infrequently there is an accompanying infection of the throat (Vincent's angina), the ulceration usually being confined to one tonsil. As the fusiform bacillus and spirochæte invariably occur in ulcerative stomatitis and in Vincent's angina and have been isolated in some cases of noma, or gangrenous stomatitis, it has been suggested that these are all really different manifestations of the same infection. In ulcerative stomatitis there is usually only slight constitutional disturbance, but there may be some rise of temperature with general malaise. In the acute stages the gums are exceedingly painful, but in chronic conditions there may be only mild discomfort.

The disease runs a benign course so far as the general health is concerned, but may give rise to serious dental consequences as it causes rapid and extensive destruction of the gingivæ and unless completely eradicated it will persist as a chronic process forming gingival pockets wherein will flourish a chronic pyorrhœa of an intractable nature.

It must be diagnosed from mercurial stomatitis and from scurvy, and if there are throat manifestations from diphtheria and syphilis, but the history and smears taken from the lesions will establish the diagnosis without difficulty. The foul and very characteristic odour of the breath in ulcerative stomatitis is alone almost pathognomonic.

Treatment.—The fact that there are almost innumerable methods of treatment is witness to the somewhat intractable nature of the disease. In many cases it is very difficult to eradicate completely, and is liable to relapse. Early diagnosis and very thorough application of whatever method of treatment is decided upon with full co-operation of the patient will ensure success, and even the late cases can be cured if sufficient trouble be taken by dentist and patient. Treatment of the patient's general condition is important and should be directed to ensure a proper dietary, bowel regulation, and as much open air and sunshine as possible, while extra vitamins may be administered in the form of radiostoleum or ostelin. It is important also to deal with any focal sepsis when the acute symptoms have subsided, especially septic tonsils, which may easily be a source of reinfection. The drugs used for local application have been selected for their probable specific action upon the organisms concerned. Their anærobic property has led to the use of such oxygen-forming antiseptics as chromic acid, hydrogen peroxide, sodium perborate, and, because of the known action of arsenic upon spirochætes, Fowler's solution and neoarsphenamine have been used. Other methods which have been employed are ionization with zinc chloride solution and the application of the ultra-violet rays locally and generally. Whatever drug is used extreme care and attention to detail must be observed. It must be applied to the carefully dried gums and must be made to reach to the bottom of every pocket and every ulcerated spot. Arsenical preparations act like a charm in reducing the pain and inflammation. Cases have been reported in which Vincent's disease has appeared whilst a patient was under active anti-syphilitic treatment, and this has been adduced as evidence that arsenic is ineffectual, but these rare cases are probably due to the patients acquiring a tolerance for the drug. Liquor arsenicalis is an exceedingly useful drug to use at the chair side. It can be applied on small wool pellets to the gums in the active stage and later worked by appropriate flat spatulas into the gum pockets. In suitable cases, those in which the affected area is very limited and easily accessible, it can be prescribed for the patient's home use, as a local application; but it is usually safer to rely on the use of undiluted hydrogen peroxide for this purpose, with instructions that the mouth-wash must be kept in the mouth for at least 3 or 4 minutes at a time, instead of the customary rinse round and spit out which is the usual stupidly ineffective way of using a mouth-wash, and it should be used every hour. In cases where the full strength cannot be tolerated it may be diluted to suit the individual. Some prefer to use chromic acid followed by hydrogen peroxide, or sodium perborate, others hydrogen peroxide for a preliminary cleaning of the gingivæ, followed by methylene blue powder worked all round and into the pockets.

The failure of many drugs, especially perhaps of arsenical preparations, is due to the fact that they are not allowed to remain in contact with the affected areas for a sufficient length of time. They should be worked into close contact with the dried gum and allowed to remain there for a full fifteen minutes. Perhaps a more thorough method of applying arsenic is to pack it carefully and gently in the form of arsphenamine powder all round the teeth, whether apparently affected or not. The powder is sometimes used dissolved in glycerine, but it is more effective if used dry, with perhaps the applicator moistened to facilitate working. An intramuscular injection of sulpharsphenamine is frequently advised, especially in severe cases. Usually only one injection is required. As arsphenamine is a rather expensive preparation, and when packed into the pockets is sometimes painful, some workers prefer to use a bismuth salt, and claim equally good, or better results. For this purpose one of the most effective preparations is a 20 per cent. solution of sodium or potassium bismuth tartrate in water or oil. Excellent results are also obtained with bismuth violet. A bismuth paste may be prescribed for home treatment, to be rubbed into the gums and later, when they become less painful, as an ordinary dentifrice on the tooth brush. It is most important that any home treatment prescribed should be maintained for at least a fortnight after the patient is dismissed as normal. No extractions must be attempted until all signs of the disease have been cleared up. It is extremely important to avoid anything of the kind during the acute stage as there is definite risk not only of spreading the infection locally, but of setting up a general systemic infection; fatal results have been reported. In cases which have become chronic under arsenical treatment and when it may be suspected that the patient has acquired a tolerance for the drug the application of other drugs, such as acriflavine alternated with powdered copper sulphate sometimes suffices. One case in a patient undergoing anti-syphilitic treatment cleared up after an intravenous injection of tartar emetic.

Box has devoted a great deal of care to the study of this disease and has elaborated a scheme of treatment which is worth recording in some detail. He uses Churchill's iodine and 35 per cent. silver nitrate. The gums are dried without causing bleeding, the gum margins are touched with wool pellets soaked in the iodine, and this is immediately followed by the application of the silver nitrate solution on similar pellets. Insoluble iodide of silver is formed; the necrotic tissue makes a whitish film which is cast off in 36 hours and seldom leaves a bleeding surface. Any stain can be removed from the teeth with ammonia. He prescribes the following mouth-wash for use by the patient at home :—

℞	Sod. perborat.	℥iv
	Sod. oleat.	℥iv
	Saccharin.	gr. $\frac{3}{4}$
	Ol. aurant.	♏ v
	Ol. gaultherin.	♏ xx
	Ol. ros.	♏ $\frac{2}{6}$
	Ol. menth. pip.	♏ ix

Sig : A teaspoonful to a glass of warm water as a mouth-wash.

This is to be used hourly for the first two days and five times daily until all necrotic lesions have disappeared and thereafter three times daily. This must be kept up for two weeks after the patient is dismissed. Forty-eight hours after the first treatment the iodine and silver application is repeated to any areas that have not cleared. Forty-eight hours later the teeth are scaled thoroughly. To avoid contamination of one area from another in scaling, a glass is used with the lower third filled with shot and the middle third containing mercuric cyanide 1/1000. The scalers are dipped into this and stirred round to clean off debris and tartar and dried on gauze. As an additional home treatment it is advised that any toothbrush in use should be thrown away and two new ones used alternately, being sterilized and dried in turn. The teeth should be brushed three times a day. All tobacco, alcohol, spice and any kind of irritant must be avoided absolutely. A mild saline cathartic should be taken. Little meat or sweets should be eaten, but plenty of fresh fruit and greens. As much rest as possible with fresh air and sunshine is advised. The patient should be warned of the contagious nature of this disease and against kissing, and told to use separate utensils, which should be boiled after use. A prescription should be given for the relief of the pain.

GANGRENOUS STOMATITIS

Noma or cancrum oris occurs chiefly in ill-nourished children between three and twelve years of age, or those debilitated after one of the exanthemata. It rarely occurs in debilitated adults. It cannot be attributed to any specific organism, though the fusiform bacillus and spirochæte combination has been located and is suspected in consequence. The patient's lowered resistance is probably the main factor. It starts as an abrasion of the mucous membrane of the cheek, or at the angle of the mouth, often unnoticed at the beginning. The abrasion becomes inflamed, hard infiltration appears, followed by softening and breaking down into a sloughy ulcer. The part involved swells, but there is little pain, and often the first sign is the intensely offensive breath. The process spreads with frightful rapidity. The whole cheek swells, perforates in several places and the gangrenous process may spread to the forehead and neck, destroying all soft tissue in its path. There is slight fever and in 90 per cent. of cases death ensues in a few days.

Treatment.—Successful results have been reported by thorough removal of the sloughs with perchloride of mercury 1/500, followed by the application of fuming nitric acid for five minutes and subsequent dressings wrung out in 1/1000 perchloride of mercury. The best chance of arresting the process, however, lies in immediate and free excision of the whole necrotic area, cutting ½ inch wide of it in the surrounding sound tissues with the thermo-cautery.

STOMATITIS DUE TO DRUGS

The predisposing causes are oral sepsis and idiosyncrasy, the latter being probably a more important factor than overdosage. The symptoms with many of these drugs are very similar. *Mercurial:* The earliest symptom is a metallic taste and tenderness of the teeth which feel elongated. The gums become sore and swollen, bleed easily and the teeth get loose. It may proceed to extensive destruction of tissue and loss of the teeth. The tongue swells, there is great salivation, the breath becomes fetid and there is general malaise.

Treatment.—Stop the administration of mercury and try to eliminate it with saline cathartics. The intramuscular or intravenous injection of contramine 0·25 gram is said to act as a specific in all cases of metallic poisoning. Clear up the attendant oral sepsis with peroxide and astringent mouth washes, e.g. 5 per cent. glycerine and tannic acid.

Chronic poisoning with *antimony*, *arsenic*, *bismuth* or *copper* will give rise to very similar symptoms. In bismuth poisoning there is the addition of a purplish line at the gum margin due to a deposit of bismuth sulphide similar to the blue line of lead sulphide in plumbism, and the breath smells intensely of onions.

Many drugs will give rise occasionally to a distinct stomatitis in patients with an idiosyncrasy. I have known at least two cases in which dentalone, a preparation of the utmost value in dentistry, has caused an exceedingly painful inflammation with considerable swelling which subsided almost immediately when the application of the dentalone was stopped. *Acetanilide*, *phenacetin*, *antypyrin*, *pyramidon* and others of this group may cause, in susceptible persons, either swelling or a vesicular eruption followed by ulceration. These manifestations occur in the mouth and on the genitalia, or may occur only in the mouth. *Barbiturates, salicylates,* and *phenolphthalein* have been known to do exactly the same in susceptible patients.

There is no space left to discuss the many cases of stomatitis which occur in association with general systemic disturbances such as the exathemata, diabetes, pellagra, and sprue. Their treatment is part of the treatment of the disease concerned with mild mouthwashes such as pot. chlor. or better still glycerine and borax applied with wool swabs.

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INFLAMMATION OF THE GUMS

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THIS is a short article on "Inflammation of the gums," technically known as gingivitis. Many acute specific infections can be diagnosed and described by other medical men, but the condition of hypertrophic and chronic inflammation of the gums, whether localized or more or less generalized, must be constantly faced by the dental surgeon, who has therefore to find a practical solution.

The line of demarcation between the gum and mucous membrane of the mouth may be taken as that portion surrounding the tooth and the ridge of the alveolar process. Round the gum attachment to the tooth is a sulcus, and it is here that debris of food lodges, and deposits of tartar generally form. These naturally cause inflammation of the gum edges which, spreading, infecting, and destroying the periodental membrane, transmits infection to the deeper tissues and so becomes one of the greatest causes of periodental disease and its many resultant complications.

Much valuable work has already been done by J. G. Turner and Warwick James in relation to the periodental membrane, its structure, and nature of attachment to the tooth, but it must be realized that it is a very ineffectual structure and a poor line of defence against the spread of infections of all kinds into deeper structures, and into the lymphatic and blood streams. Frequently it fails completely, and breaks the continuity of the mucous membrane covering the jaws. This is why the slightest inflammatory condition of the gums is so important; indeed, it cannot be too strongly emphasized that the mildest and simplest form of gingivitis may, without much or even any discomfort to the individual, progress considerably before attracting attention, and that by this time a chronic infective condition has spread to the deeper tissues and done irreparable harm.

As in all inflammatory conditions, that of the gums may be acute or chronic. Of the acute forms a catarrhal type is the commonest; it generally occurs in relation to a similar affection of the nose and air passages. The gums become swollen, œdematous, bleed easily, are very tender to touch, and may possibly discharge matter from round the roots of the teeth. This inflammation of the periosteal tissues round the teeth raises them in their sockets, so that they become loose, too long, and tender to bite on. Usually the catarrhal symptoms all clear up simultaneously, but those of the gums may persist if related to any febrile condition, such as typhoid, complicated with desquamation of the gums, and sordes on the lips. However mild the case may be, special, in addition to general treatment, is imperative for the local gum condition. Any kind of injury to the gums must be avoided. They should be bathed and swabbed night and morning, and as occasion arises during day or night. Soothing washes after bathing the gums, and swabbing the teeth are advisable, and if there is any risk that the use of a tooth-brush will do harm, this should be omitted; in its place a strong spray will benefit both the teeth and the gums.

An acute and rapidly spreading form of gingivitis of an ulcerative nature occurs chiefly in children living in unhygienic conditions, who are underfed or suffering from fevers. I have not seen much of it in children, but from experience of it in adult life find that unless it is recognized early very serious trouble may follow. If, however, an early diagnosis is made the disease can be kept well in check by adequate treatment. Unfortunately it is seldom realized what delayed treatment or neglect may mean to the progress of the infection. The trouble arises generally with complaints of tenderness and tooth-ache in a localized area, and ulceration frequently takes place in the gum around the tooth. This soon spreads to other teeth in either jaw, and pain may be severe; ulceration may spread to the fauces and tonsils, the lymphatic glands may become tender, and fever may follow. Diagnosis is easily confirmed by swabs which show spirochætes and fusiform bacilli. The patient must be kept in bed, given general treatment for constipation, kept on liquid or light diet, and the mouth and infected areas swabbed and syringed with solution of peroxide of hydrogen and dressed with tincture of iodine; arsenic is a specific for spirochætes. Extraction of any infected teeth should be delayed in the acute stages of the disease and any injury or incision avoided, as these would probably cause the infection to spread. Frequent fomentations are very helpful, and will probably localize the condition. In a rather uncommon form of chronic inflammation of the gums, of which I have just seen a case, the gums and generally the palate and cheeks are bright red in colour, the condition is long-standing, lasting for years —in this case eight years. It may have acute stages with high temperature, great soreness, and inability to take solid food. In the chronic stage it is comparatively quiescent. Sedative lotions should be used, and glycerine and borax applied locally. A diet of fresh fruit is advisable, and treatment for constipation.

Hypertrophic inflammation of the gums is extremely common, and because of its frequency is much neglected. Very few mouths that have had conservative dental treatment of any kind, or to any great extent, escape. This subject demands very serious attention and consideration; as a dental surgeon, I realize only too well the difficulties to be faced in aiming at efficient and clean conservative work. The inflammation may be localized to one area in relation to a single tooth or it may spread over the whole margin of the gums. The localized condition is generally due to some chronic stagnation, and irritation caused by the presence of some tartar deposit or some mechanical appliance, such as a gold band, collar of a crown, irritation from a denture or regulation appliance, or rough overlapping edges of fillings in the tooth; in fact any kind of mechanical appliance or stopping in the tooth may be the cause. The gum in relation to the infected part becomes enlarged and inflamed, and flaps arise around the foreign body if a fixed appliance. Stagnation occurs and the gums bleed easily if interfered with, and there is generally a foul odour from the stagnant area. The condition is usually slow in progress and is often far advanced before it attracts attention. Curative treatment is obvious—removal of the cause, and if that does not suffice, then the tooth in relation to the cause.

Obstruction of the nasal passages in children causes much inflammation and hypertrophy of the gums, especially in the incisor regions, with mal-development of the maxillæ, with dryness and stagnation, and resulting general infection, and extensive caries of teeth. The most common obstruction is that due to adenoid growths, and should be rectified as early as possible, and breathing exercises given. Delayed treatment results in permanent deformity of the maxillæ, high V-shaped arch and mouth breathing.

Under the most favourable conditions, a mechanical appliance of any kind must tend to cause irritation and stagnation, resulting in hypertrophic inflammation. But, if detailed care is taken, a very fair compromise can be arrived at in most cases. It should be an accepted principle that no fixed attachment should pass below the gum margin or be inaccessible to perfect mechanical cleansing. As regards crown and bridge work, this necessitates much skill, and involves much time and care. The vast majority of work done fails hopelessly in these details, and should be condemned. A crown or bridge may give a firm biting surface, but soon becomes fixed in a foul septic base, and thus contributes to many other troubles. It is far better from a health point of view to have a deficiency of teeth and a clean mouth, than a full complement and a foul infected gum and mucous membrane. Another cause of much gum inflammation is the use of mechanical appliances in regulating teeth. Extractions at the right time would often obviate much work that is done by, or credited to, regulation appliances. The same holds good as regards ill-fitting and ill-cleansed dentures, especially partial dentures. If this danger were more universally recognized much more care would be given to the use and care of all such appliances.

A common cause of marginal gingivitis is the deposit of tartar on and around the teeth and gums. This is of varying degrees of hardness and should be carefully removed, the surface being left smooth and clean. A much harder and darker form of tartar than the common kind occurs deeper on the tooth and requires most careful treatment. Among other causes reference should be made to metallic poisoning such as mercury and lead, and traumatic gingivitis due to the misuse and abuse of the tooth brush.

Unfortunately, gingivitis is so general that it is almost accepted as a normal condition. What can be done not only to cure it, but to prevent it? In trying to suggest a line of treatment it must be conceded that good, skilled, conservative dentistry is a luxury beyond the reach of a large percentage of the population. But if the maxim of no stagnation and efficient drainage be accepted as a starting point for treatment, good can be done in all cases. And when a definite line of treatment has been decided upon, in order to ensure beneficial results, it must be carried out strictly by the individual or, in the case of young children, by those responsible for their care and upbringing. There is no doubt that an outstanding cause of gingivitis is neglect in efficient cleansing of the gums and teeth. The doctrine, "Brush your teeth," is good, but, unfortunately, vigorous brushing of the gums goes with it, causing real injury, especially in children. Gingivitis if neglected causes pain.

By far the best line of treatment is to bathe the gums with a swab of cotton wool dipped in some simple lotion. The cotton wool can be carried on a stick or tweezer, and the gums firmly and gently massaged with it, going carefully round all the surfaces of the teeth, both the lingual and buccal sides, removing all stagnant mucus and debris, after which the surfaces of the teeth may be carefully brushed. For infants and children a solution of warm sodium bicarbonate should suffice, but it must be done in careful detail and with sympathetic handling. Rough, hard handling is fatal, as the child loses confidence and resents treatment. A solution of thymol and glycerine is also useful in all inflammatory conditions.

When teeth erupt, whether milk or permanent dentition, they should be carefully brushed, great care being taken to avoid the gums. Much benefit will be derived from the use of a syringe which will flush away any accumulated debris around the erupting teeth. Later on this should be carried out as a routine procedure, and it will be found invaluable in erupting molars, especially the wisdom teeth, which, owing to delay and difficulty in erupting, frequently cause inflammation of the gums and if neglected result in septic trouble.

It would be a great advance and help if nurses were given instructions in dental hygiene during their training—in fact not only nurses, but all those responsible for the upbringing of the young in any sphere of life. I would suggest that they should be given opportunities for practical experience; for although it may be easy to look on or even to know what should be done, it is another matter to be able to carry it out efficiently, and it does require very gentle handling to cleanse a child's mouth properly without losing its confidence. If the nursing profession would only realize what an immensity of good they could do by this small detail in their daily work, they would do it with all the care that is theirs to give.

As I have said, swabbing and syringing should be carried out as a daily routine, and when inflammatory conditions of the gums arise, or continue, they should be syringed with a solution of carbolic and iodine (the carbolic 1 in 80 strength) or peroxide of hydrogen. When clean, the pockets of inflamed areas may be dressed once or twice with iodine tincture. Should this careful cleansing fail to cure or even arrest the inflammation, then it will be advisable not to delay too long the extraction of a tooth or teeth from the infected areas. Too long delay often involves complete extraction of the teeth, and frequently with poor results, as the infection may have gone far beyond a localized inflammation, and spread into the deeper parts of the jaws, and the general circulatory system. In this case extraction can no longer effect a cure, but only prevent reinfection from the gum margin.

When making early extractions the aim should always be to leave the remaining teeth functional and so avoid any cause for replacement with artificial appliances, as they defeat the object of the extraction. Unfortunately when it is a case of having to lose front teeth, from an æsthetic point of view artificial replacement is essential, and this replacement, whether by fixed or moveable appliances, is a curse. This point should show how important it is to carry out dental hygiene efficiently. Much more might be said about adequate cleansing of dentures which are such a common cause of sepsis and gingivitis. But avoidance of injury to gums, the prevention of stagnation, and efficient drainage, if carefully carried out, should go a long way to prevent much of the deep-seated jaw infections, resulting from inflammatory conditions of the gums.

TUMOURS AND ULCERATIONS OF THE PHARYNX

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TUMOURS of the pharynx, tonsil and soft palate are not uncommon, and the purpose of this short article is to urge the necessity of making a careful examination of tumours and ulcerations in this region and of bearing in mind the different types of disease that may be present. The most important single factor in the treatment of malignant disease of the pharynx is the time factor, and unless the family practitioner is given the opportunity in time by the patient and the surgeon is given the opportunity in time by the practitioner, advances in treatment—whether by new methods of employing radium or therapeutic X-rays or by diathermy or modifications of surgical technique—will prove in vain.

Case 1.—A married woman, aged 49, complained of discomfort in the throat and pain in the left ear, which began nine months previously, and were getting steadily worse since. Six months ago a small ulcer was noticed on the left tonsil, which was treated with antiseptic gargles; but the ulceration grew larger and extended over the anterior pillar of the fauces. The patient became alarmed at the appearance of the ulcer and came from abroad, where she lived, to consult a surgeon in London, who referred her to me. The illustration shows the condition of the throat when she consulted me. The ulcer had a hard, overhanging edge and the tumour of the tonsil was stony to the touch. Biopsy showed it to be carcinoma. The patient had several carious teeth, which were removed, and after the gums had healed the growth was removed

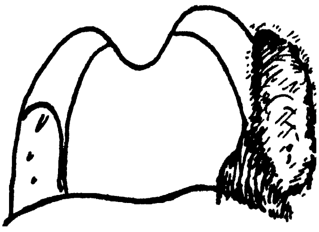

FIG. 1.

by diathermy and the glands in the neck on both sides treated by deep X-rays according to Coutard's fractional dose method. The patient, however, was in an emaciated condition before operation and did not do well; she died of cachexia in three months.

In the above case symptoms had been present for nine months before the patient invited medical advice about the ulceration in her pharynx, and as a result surgical treatment was of no avail. The method of treatment employed would, apparently, make very little difference. G. Gordon-Taylor[1] insists that in the treatment of malignant disease of the oral cavity the knife and scissors are obsolete, and that the use of diathermy has brought about a great improvement in the operative results, though in the treatment of potentially infected glands of the neck he prefers to use the knife for block dissection, rather than diathermy or the burial of radium needles or radon seeds. Gwynne Williams,[2] on the other hand, does not find that the ultimate results, so far as recurrence is concerned, are any better with diathermy than with the knife and forceps. This present article is concerned, however, with diagnosis rather than with treatment; for the general practitioner would be ill-advised to do anything other than to send these patients to a surgeon at the earliest possible moment. The following case may be contrasted with the first:—

Case 2.—A married woman, aged 65, complained of nasal catarrh and an irritable throat for three months past. On examination the right tonsil was slightly larger than the left, and about the middle of it there were a few tiny nodules (*see* illustration).

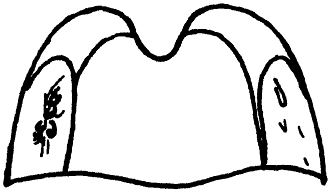

FIG. 2.

I admitted the patient to hospital and dissected out the right tonsil under evipan anæsthesia. Microscopical examination revealed squamous epithelioma at the part where the nodules appeared. The patient was thereafter given a course of deep X-rays by the fractional dose method to the right side of the throat and the glands of both sides of the neck, and so far (six months later) has remained free of any sign of recurrence.

In making a diagnosis in such cases, three things only are essential: a good light (there is no excuse for not having a good light; it is unnecessary to learn to manipulate the head-mirror, for an excellent electric headlight can be purchased for seven shillings and sixpence and an electric torch is usually adequate), a tongue depressor, and the forefinger. It is important to feel the tumour or the ulceration, and to learn to diagnose a cyst or an encysted abscess from a gumma or a sarcoma.

Case 3.—An unmarried woman, aged 45, had noticed a swelling of the right tonsil for two weeks past and consulted her practitioner. He observed that while the right tonsil was considerably enlarged (*see* illustration), the other was quite small, and brought her to consult me next day. I found that the swelling was confined to the right tonsil, which was freely movable, and was stony hard to the touch. I persuaded the patient to go into a nursing home that night, and next morning, under general anæsthesia, I carefully dissected out the right tonsil. Microscopical examination proved it to be a lympho-sarcoma (spindle-shaped cells), completely confined within the capsule of the tonsil. After a few days in bed the patient began a course of deep X-rays by the fractional dose method, directed to the glands of both sides of the neck; she has had two courses of this treatment, and so far (eighteen months after) shows no signs of recurrence.

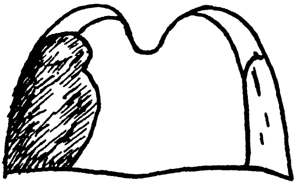

FIG. 3.

It must not be thought that all or nearly all the tumours of the pharynx are malignant. I have emphasized the possibility of malignancy because of its importance, but papillomas, fibromas, adenomas, lipomas, chondromas, teratomas, cysts and almost any variety of tumour may be found in the region of the pharynx, as well as aberrant salivary or thyroid gland tissue, for the palate is formed by a very complicated infolding of fœtal structures. One of the most interesting types of tumour is the mixed salivary tumour, most commonly found in the parotid and called mixed parotid tumour. It sometimes shows malignant characters, and should be treated as if it were a malignant tumour:—

Case 4.—A man, aged 45, complained of a swelling in the region of the left tonsil. He had had an attack of acute tonsillitis two weeks previously, and had not noticed the swelling before that. There was a large firm tumour attached behind and internal to the left tonsil pushing the tonsil forward. It was thought that the condition was probably an encysted peritonsillar abscess, but might be a sarcoma. A week later the left tonsil was dissected out under general anæsthesia, and was found not to be attached to the tumour. By dividing the muscle fibres of the tonsil bed, a rounded, smooth encapsuled tumour was exposed and was shelled out; the only difficulty was at its further end, which was attached to the vertebral column. On microscopical examination the tumour was found to be a mixed palatine tumour, epithelial in origin, derived probably from the ducts of a salivary gland. The tumour probably arose from an aberrant salivary gland, such as is sometimes found in association with the tonsil. This patient died two years later of pneumonia, no recurrence having appeared in the meantime.

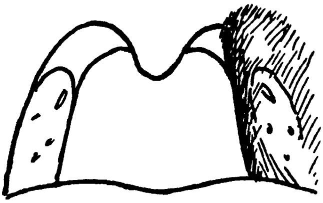

FIG. 4.

The diagnosis of an ulcer of the pharynx may sometimes present unusual difficulties, and various pathological investigations may have to be carried out in order to make a definite diagnosis, for the ulcer may be due to syphilis, tuberculosis, Vincent's angina, or malignant disease, as well as stomatitis or herpes.

Case 5.—A young married woman, aged 26, complained of pain at the left side of the throat, on swallowing, for the previous five weeks. She had had an operation on her tonsils two years previously, but they had been incompletely removed, and on examination a white, smooth-edged, ulcer occupied most of the tonsil remains on the left side. Her post-nasal space was clear and her larynx quite healthy. Her throat had the odour characteristic of Vincent's angina, and I took a swab from the ulcer and at the same time painted it thoroughly with neo-salvarsan applied by a cotton-wool swab dipped in glycerine. The report on the swab which I received two days later was that there were staphylococci and non-hæmolytic streptococci present, with a few Vincent's spirilla; no diphtheria bacilli. I saw the patient a week later, after she had had further local treatment with neo-salvarsan, but there was no improvement at all, and the pain on swallowing was rather worse. I then took a scraping from the ulcer for further examination and took a specimen of blood for Wassermann test; the scraping was negative (I asked especially that tubercle bacilli should be looked for) for organisms other than staphylococci and non-hæmolytic streptococci, while the Wassermann test was completely negative. Microscopical examination of a piece punched from the edge of the ulcer showed granulation tissue only. I then advised that the ulcer should be treated as a simple ulcer, probably originally a Vincent infection, with anæsthesin and orthoform (half and half) powder insufflated to ease the pain on swallowing. I did not see the patient again for two or three weeks, when I was called to see her on account of a sudden flare-up of temperature. The ulcer was much the same as before, but examination of the larynx revealed a glazed epiglottis and swollen arytenoids, characteristic of a tuberculous invasion of the larynx. Examination of the chest showed nothing definite beyond some crepitations at the right apex, but bacteriological examination of the sputum showed a few tubercle bacilli. A bad prognosis was given, but as a matter of fact the patient eventually did very well, the ulcer of the tonsil healing as her general condition improved.

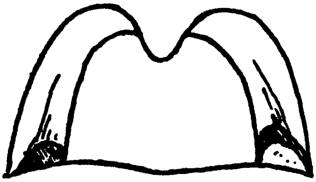

FIG. 5.

It is unfortunate that the early symptoms of tumours of the pharynx are usually so slight—at most there may be some trifling interference with swallowing or speaking—that the patient may notice nothing until the condition has become considerably advanced. When, however, in an adult, the practitioner making a routine examination observes definite differences in the appearance of the two tonsils or the sides of the pharynx, it will usually be wise to refer the patient to a laryngologist for more thorough examination and not to waste what may prove invaluable time in trying the effect of paints, gargles, or potassium iodide.

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[2] Williams, Gwynne: *Proc. Roy. Soc. Med.*, 1926, xx, 759.

THE PRESENT POSITION OF THE TREATMENT OF VARICOSE VEINS

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THE introduction a few years ago of injection treatment completely altered, almost in a night, the whole treatment of varicose veins. Operations for varicose veins disappeared from the operating lists, and the knife was banished to make room for the needle. There is now available, it was argued, a simple, safe, and sure method of treatment for all cases of varicose veins, and one moreover that can be carried out without the expense and inconvenience of confinement to bed. So great became the demand for the new treatment that many hospitals had to set up special clinics to cope with the crowds of patients, and in addition practitioners everywhere were called upon to treat large numbers of patients. Recently, however, signs have begun to appear that everything is not well with the injection treatment of varicose veins. Articles have appeared in the medical press of many countries complaining of the high incidence of recurrence after injection treatment; other papers have dwelt on the importance of prolonged after-care, and operative procedures of various types have begun to creep back. The time therefore is ripe to recast our ideas on the treatment of varicose veins. This article, based on the work of the Varicose Vein Clinic of the Middlesex Hospital during the past four years, reviews my conclusions on the position which operation, injections, and other measures should occupy in the treatment of varicose veins to-day.

In the first place, all cases of varicose veins are not alike, and what may be suitable treatment for one case may not necessarily be so for another. The following is a simple clinical grouping of varicose vein cases together with the treatment advised for each group :—

(1) *Varicose veins filling by single, readily recognizable, and easily controlled venous trunks.*—The classical example of this is the varicose condition of the internal saphenous venous system, in which there is a dilated incompetent main internal saphenous vein in the thigh, and varicosities of different sizes and degrees of complexity in the leg, all of which after emptying are controlled by pressure on the main saphenous trunk in the thigh. Before the days of injection treatment, this type of case was treated by Trendelenburg's operation, which consisted in excision of the extreme upper part of the saphenous trunk. Although this operation often gave very good results, it sometimes failed owing to the presence and subsequent development of perforating communicating veins lower down. On the other hand, injection treatment alone is not usually satisfactory owing to the difficulty of obliterating the main saphenous trunk, and the frequency of its recanalization. In these cases the most successful results can be obtained by a combination of excision and injections. Probably it is best to excise the whole of the main vein in the thigh from the saphenous opening to the inner side of the knee, and this can readily be done subcutaneously with Babcock's probes. This operation, however, requires a general anæsthetic and a stay in bed, and in order to avoid this we have contented ourselves in most cases with excising about four inches of the vein from the middle of the thigh through a vertical incision under local anæsthesia, the patient subsequently being allowed to return home. This more limited operation is performed in the operating theatre with all aseptic precautions, and particular attention is paid to hæmostasis, the cut ends of the main vein being tied

with two, or even three, separate ligatures. With these precautions there has not been any anxiety about treating these cases as out-patients. At the time of the operation an injection is given into the lower end of the exposed vein. The solution used has been quinine and urethane of half the usual strength (i.e. quinine bihydrochloride approximately 5 per cent. instead of the usual 10 per cent.), and we have injected up to 8 c.cm., depending on the extent of the varicosities, the usual dose being 5 to 6 c.cm. At the end of the operation the leg is bandaged from the instep to above the incision with elastic adherent strapping. The patient is instructed to take things quietly for the first 48 hours, and the strapping is left undisturbed for ten days.

The results in suitably chosen cases of this combined excision and injection treatment have proved very satisfactory, and in many cases the procedure described is sufficient to obliterate the whole varicose area. If a few varicose veins still remain, they usually respond readily to one or two further injections, since the main regurgitant stream has been cut off.

We also endeavour to apply this combined treatment in other similar types of varicosity besides the classical internal saphenous, whenever it can be demonstrated that there is a varicose system fed predominantly by one venous trunk controllable by pressure.

(2) *Early varicose veins.*—A type of case frequently seen is that of a young woman or girl who has noticed a few small varicose veins and comes because of their bad cosmetic effect, rather than because they are causing any trouble. Cases of this type are the most satisfactory for pure injection treatment; the veins usually respond readily, the treatment is not prolonged, and experience proves that the late results are good. A word of caution, however, is necessary about the treatment of these cases: sometimes in anxiety about

the beauty of her legs, the patient comes with veins so small that their injection would be very difficult. It is best, therefore, owing to the disastrous effects following leakage of the solution into the subcutaneous tissues, not to be too ambitious in these cases, and to treat those veins only which can quite certainly be safely injected.

(3) *Extensive varicose veins filling through numerous venous trunks, difficult to recognize, and impossible to control by proximal pressure.*—This is a very difficult type of case to deal with. Treatment by operation alone is unsatisfactory, since it is practically impossible to secure all the communicating venous trunks through which the varicose veins fill. Injections in many cases undoubtedly give considerable symptomatic relief and cosmetic improvement, but the treatment has definite disadvantages and limitations. For in these extensive cases it is a long and tedious business for both patient and practitioner, often extending over many months, and at the end recurrence owing to recanalization of obliterated veins is not unlikely. Each case has to be judged on its merits, and it is probably best to explain fully to the patient the possibilities and the difficulties, and to weigh carefully other factors, such as the age and temperament of the patient, before deciding whether active treatment by injections or palliative treatment by supporting bandages is best suited to the particular case.

(4) *Very large varicose veins.*—Very large varicose veins are difficult to obliterate by injections; large doses are usually required, and, if successful, the resultant local reaction is likely to be severe. For this reason, very large varicose veins are probably best treated by excision or a combination of ligature and injections.

(5) *Dilated skin venules.*—In some cases the patient is chiefly concerned about collections of small dilated

skin venules rather than subcutaneous varicose veins. The treatment of these skin venules is not very satisfactory, as they do not as a rule lend themselves to direct injections. If there is an obviously communicating subcutaneous varicose vein, the injection of this sometimes does good. Otherwise, the possibility of X-ray or radium treatment as for angiomas should be considered.

(6) *Varicose veins associated with ulcers.*—The relation of varicose ulcer to varicose veins is not always clear. Thus, on the one hand, very well-marked cases of varicose veins without the slightest trace of skin blemish are common, and, on the other hand, varicose ulcers without any trace of varicose veins are frequently seen. But if varicose veins are present in association with ulcers, it is as well to give the patient the benefit of the doubt and, in addition to treating the varicose ulcer, to treat the veins actively by the means best suited to the particular case. Unfortunately, it is impossible absolutely to guarantee that the treatment of the varicose veins will prevent the recurrence of the ulcer.

(7) *Varicose veins associated with other leg troubles.*—Finally, patients with varicose veins not infrequently suffer from symptoms due to other troubles, such as foot strain. It is, of course, important to recognize this, as the proper treatment in these cases is that of the condition causing the symptoms, the veins often not requiring active treatment.

Conclusion.—Many points in the etiology of varicose veins are still obscure, and until these are cleared up treatment cannot be entirely rational and satisfactory. At present it is necessary to recognize that cases of varicose veins fall into different clinical types demanding different types of treatment. But contrary to what is sometimes thought, surgical methods still occupy an important place in the treatment of varicose veins, and the best results are obtainable in cases in which surgical and injection methods can be combined.

SOME OBSERVATIONS ON THE DIAGNOSIS OF SILICOSIS

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INTRODUCTION

THE diagnosis of silicosis can only be arrived at with any degree of certainty by considering exhaustively the history, physical signs, radiological, pathological and chemical examinations. During life, an endeavour should be made to render deductions upon a pathological basis, because too frequently the diagnosis of this, and its allied complication silico-tuberculosis, is only made absolute at autopsy—i.e. the physical signs should be interpreted in terms of pathology so that they will convey to us some idea of the morbid changes present in the lungs. These can be correlated with the radiograph and possibly later confirmed in the post-mortem room. As far as the radiological aspect of the question is concerned it is of paramount importance to appreciate that interpretations of any morbid pulmonary condition should be based upon a thorough knowledge of the anatomy and histology of the lungs, and upon the pathological processes peculiar to the infecting or etiological agent. It is not our intention to discuss the etiological considerations, except to state that some infecting factor seems to be at work in the group of cases we have investigated. It appears that the silica particle, as such, is not solely responsible for the causative lesion, and recent work by Jones[1] brings forward evidence that a hydrate of potassium aluminium silicate or " sericite " is the causative factor of the pulmonary lesions of these workers. However, the evidence as it stands at present is not convincing. The lesion, as it appears in the South Wales coal-miners appears to be unique in many respects.

We have endeavoured in this investigation to express some clinical radiological and pathological views on the diagnosis of silicosis as it occurs in the South Wales coal-miners, with some notes on the differential diagnosis of the super-imposed tuberculous infiltration, frequently found in these workers.

Industrial history.—The history of exposure in the mines is of exceptional importance—the number of years worked underground, the nature of the seams encountered, the character of the rock and sand, and the type of labour carried out—drilling and rock-boring—are points into which full inquiry should be made. In some of our cases it is surprising how early radiological evidence of fibrosis is present, even after a relatively short period in the mines.

Symptoms.—The patient is a male usually between the age of 20 and 45 years, and apart from cough and expectoration of a muco-purulent nature or " black-spit," the most constant symptom is a progressive dyspnœa, especially noted on the least exertion.

Physical signs.—These are most variable and are not pathognomonic. They are usually associated with bronchitis and emphysema. The chest is well covered and unless there is any marked degree of super-imposed tuberculosis there is no wasting. Inspection and palpation reveal limitation of the chest expansion, and movements are restricted—especially in the basal regions. The percussion note may or may not be impaired—usually there is a general impairment on percussion, especially in the earlier stages of the disease and later when consolidation is present there is absolute dullness. Auscultation reveals signs of bronchitis and emphysema, although the chest may be entirely free from moist sounds. In an advanced case signs of fibrosis and consolidation are usually present. The breath sounds are frequently weak with a diminished air entry into one or both bases. We have noticed a peculiar but very constant and characteristic harshness at the end of the inspiratory phase, even when all other abnormal auscultatory signs are absent. If there are definite signs of cavitation present there can be but little doubt that the case is complicated by tuberculosis. A silicotic lung may show multiple small cavities at the post-mortem, but these cavities cannot be recognized clinically.

SPECIAL CONSIDERATIONS

These comprise: (1) Sputum examination. (2) X-ray examination. (3) Chemical, Pathological and Histological examinations.

(1) *Sputum examination.*—Silicosis undoubtedly produces a fertile field in the lung for the tubercle bacillus and the liability seems to increase in proportion to the degree of silicosis present. The more chronic manifestations of tuberculosis are observed in men with advanced silicotic lesions. The sputum should be examined in every case as a matter of routine. If continually negative by ordinary examination (Ziehl-Neelson method), it should be examined by the antiformin concentration method. If again negative, a guinea-pig inoculation should be carried out, followed by post-mortem examination of the animal six weeks later.

(2) *X-ray examination.*—Probably the earliest collective X-ray studies on a large scale were made by the South African Miners Phthisis Commission, the report of which was published in 1916. In all pulmonary cases in which a diagnosis is sought a good X-ray film is essential. The technique is important and should be standardized, e.g. exact centreing of the patient, speed of exposure to avoid blurring, and standard developing. It is logical that the stages of fibrosis in silicosis should be based upon radiological appearances. A clinical

classification would be based largely upon progressive dyspnœa and capacity for work—in fact these can be correlated intimately with the X-ray appearances.

Ante-primary stage.—An ante-primary stage is described by American workers.[2] Workers in this country describe a pre-Rœntgen-ray stage followed by first, second and third stages. In the ante-primary stage changes take place in the central portions of the lungs. There is a slight hazy increase in density with or without the appearance of fine striation. Within these areas there are occasionally found a few pin-point " nodes "—probably representing the beginning of visible deposits in the lymphatics. Other conditions, such as passive congestion may give rise to these appearances.

First stage.—The radiograph shows increased prominence of the hilar shadows. The trunk shadows of the mid zone show some thickening and the linear markings are more defined in the peripheral zone (Fig. 1). On screening examination the inner half of the diaphragm is frequently restricted in its movement in full inspiration. Other conditions may give rise to these appearances, e.g. passive congestion from cardiac decompensation and acute and chronic respiratory infections. Usually there is no difficulty in detecting coincident tuberculous infection in this stage.

Second stage.—In this stage the characteristic mottling throughout the lungs, due to small fibrotic nodules, is present. In the early period the mottling appears around the root of the lung and later the shadows are uniformly and rather symmetrically arranged. It is stated by some authorities that these appearances become perceptible initially in the right lung, and are regarded as due to the larger air entry into the right lung—in our cases this has not been very evident. The bases of the lungs are relatively clear owing to the associated emphysema (Figs. 2 and 3). On screening examination the descent of the diaphragm may be restricted only in its inner half as occasionally noted in the first stage, but there may be a definite restriction of movement throughout its entire extent. The appearances are fairly characteristic and not likely to be confused except with miliary tuberculosis or broncho-pneumonic tuberculosis. The clinical history, absence of fever and other constitutional evidence of tuberculosis are the distinguishing points. The density of the silicotic nodes and the associated fibrosis are factors which help to differentiate this disease from miliary tuberculosis. Multiple metastases like carcinoma and sarcoma may also simulate broncho-pneumonic tuberculosis, but metastases are more sharply defined and are of a homogeneous density; they tend to clump together and leave the apices clear.

Third stage.—This stage is characterized by a diffuse fibrosis. The fibrotic nodules are larger and where most prevalent tend to coalesce into still larger irregular masses. Pleural thickening is evident especially in the peripheral regions (axilla) and, it may be noted here, that under-exposed films show this rather well. Massive fibrosis with extensive pulmonary consolidation is also common in this stage. It is usually symmetrically localized to one area in each lung but is occasionally unilateral. Dense fibrous bands can often be seen extending in various directions in association with massive fibrosis. Diaphragmatic deformities are gross and show marked peaking (Figs. 4 and 5). On screening, the movements are very restricted and in most cases the diaphragm is immobile and fixed. Depending upon the degree of fibrosis present, the heart, great vessels and trachea are sometimes displaced. The difficulties in diagnosis in the third stage are in the detection of super-imposed tuberculosis. There appears to be some difference of opinion as to the exact pathological changes leading up to the formation of areas of massive fibrosis, but the consensus of opinion seems to indicate that these areas are the result of a combined lesion—

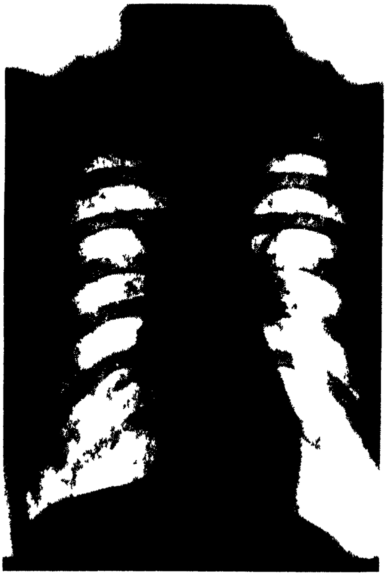

FIG. 1. Showing silicosis—stage I Note the increased prominence of the hilar shadows with thickening of the trunk shadows Linear markings are defined and there is some degree of reticulation present Emphysema is present at the bases and the right diaphragm is flattened and the costo phrenic angle is partially obliterated.

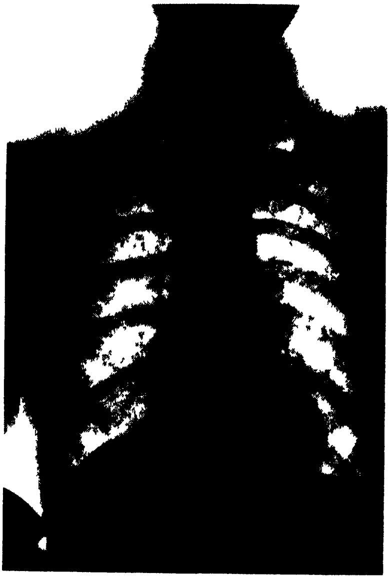

FIG. 2 Showing the characteristic coarse mottling, symmetrically arranged throughout both lung fields in the second stage of silicosis. Emphysema is present at the bases, but to a less extent than in the first case (Fig. 1). The bases are affected to a rather unusual degree

FIG. 3. Secondary silicosis passing into the tertiary stage showing coalescence of nodules to form small consolidated areas in the mid zone. Note the peripheral pleural thickening and the flattening of the right diaphragm, and partial obliteration of the costo-phrenic angle.

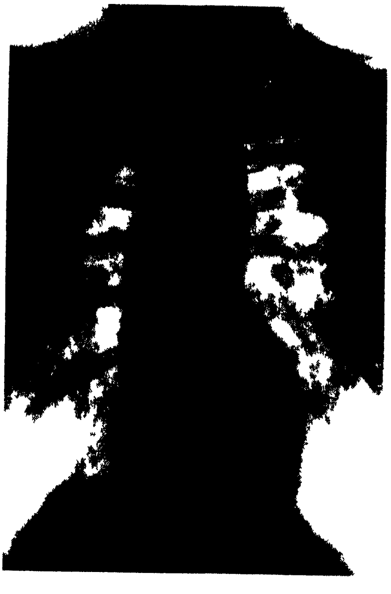

FIG. 4.—Third stage or tertiary silicosis. Consolidated areas occupying the peripheral parts of the upper and mid zones. Marked emphysema at the bases of the lung.

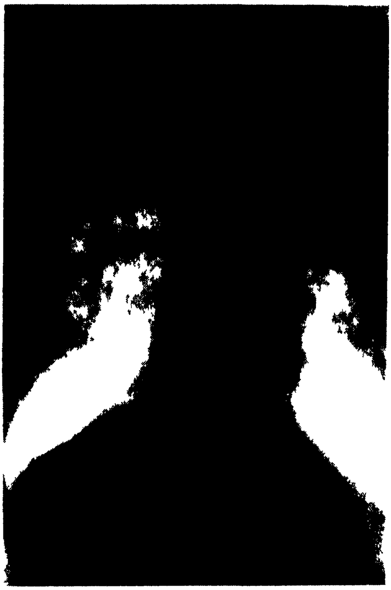

Fig. 5.—Third stage silicosis—"cricket-ball type." Dense localized consolidated areas in both upper zones. The mediastinum is drawn to the left. Extreme degree of emphysema at the bases with marked irregularity of the diaphragm.

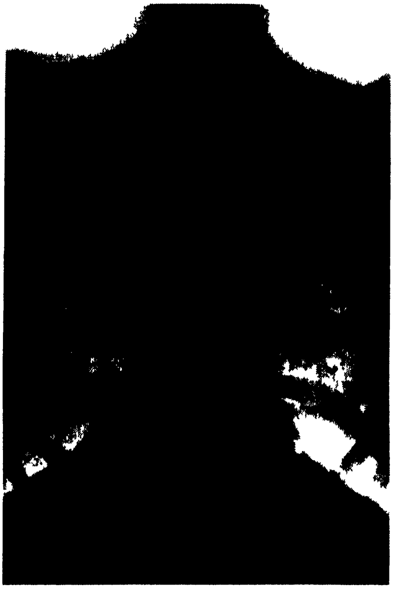

Fig. 6. Showing a mixed lesion of silico-tuberculosis (sputum positive case). There is cavitation in the left upper zone. Typical silicotic coarse nodular fibrosis in mid zones.

Fig. 7.—X-ray photograph of lung after removal from cadaver, showing dense fibrotic areas.

Fig. 8.—Section of lung showing dense fibrotic apical area with considerable emphysema at the base.

silicosis and tuberculosis—the latter being of a very chronic type. When the skiagram shows definite evidence of cavitation in the apical or infra-clavicular regions, superimposed tuberculosis is invariably present. From a radiological standpoint, dense shadows of fibrotic consolidation in the regions of the apices and upper zones should always be regarded with the suspicion that the lesion is a combined one of silico-tuberculosis (Fig. 6).

(3) *Pathology of silicosis.*—Experience has taught us that it is impossible to arrive at anything approaching a correct diagnosis of this condition without the most careful correlation of both the macroscopic and microscopic appearances together with the silica content of the tissue under examination. The correlation of these three factors is essential, because the intensely black colour of the majority of the lungs that we have examined has tended to mask other conditions which may be mistaken for silicosis, in fact we have recently examined lungs in a state of pneumonic hepatization, and also those containing the metastases of carcinoma in which the macroscopic appearances and silica content were almost characteristic of silicosis.

Method of examination adopted.—The method of examination is best illustrated by reference to the photographs. The lung after removal from the cadaver was X-rayed, a soft tube being used (Fig. 7). Depending upon the areas shown in the film, portions were removed for examination. The macroscopic appearances, not only of the piece removed but of the immediately adjacent lung, were carefully noted (Fig. 8). The portion removed was then divided into two so that, as far as possible, macroscopically identical portions were used for preparing the sections, and for estimating the silica content. Six such areas were examined. While we realize that this method is open to considerable criticism—as are most methods of this nature—still, we feel that it enables us to give a fairly full and accurate description of the pathological condition present. The silica determinations are of great value and importance when considered with the remaining diagnostic factors, but, alone, they are of little value as a high silica content may be found in lung tissue in which no gross lesion is present. The absence of a high silica content is obviously against a diagnosis of silicosis. The silica determinations were made both by a modification of the colorimetric method of Isaacs[3] and by the gravimetric method described by Treadwell and Hall.[4]

Macroscopic examination.—The pleura shows considerable variations in thickness. Adhesions are common, but in the absence of tuberculous infection they are, as a rule, easily separated. When there is a super-added tuberculous infiltration the pleura may be a quarter of an inch in thickness and the adhesions are so many and dense that it is quite impossible to remove the lung from the cadaver without cutting through them with a knife. The lung tissue is invariably of a black colour and presents a characteristic rough rubbery feel to the gloved finger. In the secondary stages these fibrotic areas are nodular and, in the tertiary, become large, coarse and hard, and tend to occupy the middle zone of the lung. In all, there is a tendency to the development of a coarse compensatory emphysema. The distribution of the emphysema is interesting in that the bases of the lungs, which almost invariably escape the fibrotic changes, show it to a marked degree. It is, in addition, commonly found in the lung tissue between the fibrosed areas. The interlobar and interlobular septa show marked thickening and this can be demonstrated on the pleural surface quite well in those cases where this latter membrane is not unduly thickened.

Microscopic appearances.—Excellent descriptions of the microscopic appearances have been given by Cummins and Sladden,[5] Cooke[6] and others. There has, however, been a tendency to focus attention on the whorled nature of the fibrous nodules, and while we agree that these do occur, they are by no means typical of the condition. In the early stages thickening occurs in the walls of the smaller bronchi, blood vessels and in the interlobar septa. The lymphatics accompanying these are found choked with accumulations of dust. The alveolar walls themselves are thickened, eventually to such a degree that they come in contact. In the more advanced stages areas of fibrous tissue are found varying in size from a pea to an orange. The appearance of these larger areas under the lower power is very characteristic and conveys to the eye the impression that considerable numbers of thickened alveoli have collapsed and become fibrosed together. The alternating lines of clear hyaline fibrous tissue and black dust are certainly suggestive that this does occur. The vessels in the final stages show interesting changes, the lumen being almost completely obliterated. It is suggested that the small irregular cavities formed by

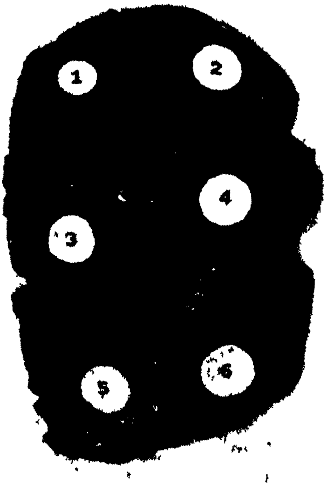

FIG. 9.—Showing areas from which portions of the lung were removed for examination.

the breaking down of the fibrous tissue are due to this obliterating endarteritis producing a localized type of ischæmic necrosis. Immediately beneath the pleura there is very commonly evidence of a chronic inflammatory change with new blood-vessel formation. The small areas of lymphatic tissue found beneath the pleura are normally found in all lungs, and are not evidence of an infective inflammatory change.

The silica content.—The examination of the silica content of the lungs is, as stated above, an essential part of the diagnosis and a representative series of determinations made on the lung (shown on Fig. 9) are given below :—

Area examined.	Percentage of silica in ashed lung
1	28·15%
2	16·32%
3	29·66%
4	24·77%
5	25·18%
6	21·80%

SUMMARY

(1) Clinical and radiological examinations have been described in each of the three recognizable stages, and it has been shown that the correlation of these factors with the industrial history is essential for a correct diagnosis.

(2) Brief details of the macroscopical and microscopical appearances of the condition are described, together with a series of silica determinations made by the colorimetric method noted in the text.

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" ESSENTIAL " HÆMORRHAGIC PURPURA, WITH TRANSIENT MID-BRAIN SYMPTOMS

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THIS case was briefly reported in the *Proceedings of the Royal Society of Medicine*,[1] and I am therefore indebted to the Honorary Editors for permission to publish the case in full.

Edith W., aged 10 years, was admitted to the Royal Waterloo Hospital in November, 1932, mainly for epistaxis. She was plump and pallid. There were petechiæ and ecchymoses on the trunk and limbs. At this time the blood platelets numbered only 25,000 per cubic millimetre, the clotting time was practically normal, and the bleeding time was 11 minutes against a normal 4. Plugging of the nose and blood transfusion were carried out, without any durable relief.

The nervous symptoms.—On January 7th, 1933, the child was taken home against advice. On January 12th she was brought to Out-patients because of a " funny look " in the eye, double vision and staggering gait, and was again admitted to the ward. Examination revealed that the right upper lid drooped, that the right superior rectus was very weak, and that the right pupil was dilated and fixed. The power of accommodation was lost in the right eye. There was impairment of the inward movement of the right eye, both conjugate and convergent. The left eye showed normal movements, with one exception; although its conjugate inward movement was brisk, yet its convergent inward movement, so far as could be determined, was sluggish. The optic discs were both healthy. There were also :—(1) weakness of the left lower facial muscles; (2) a difference between the two plantar reflexes of which the right was strongly flexor, the left indefinite; and (3) slight ataxia of the left arm. The gait was somewhat unsteady, but whether the unsteadiness was due merely to the diplopia or resulted directly from the mid-brain disturbance was not determined.

The child was alert, nervous and intelligent. The abdominal reflexes were equally brisk on the two sides of the body, and to rough tests there was no sensory impairment such as might suggest involvement of the median fillet. Petechiæ and ecchymoses were present, including petechiæ in the mouth. The bleeding time was still prolonged and the blood platelets scanty; the clotting time was normal. The nervous manifestations slowly disappeared; the order of recovery being (1) arm; (2) face; (3) accommodation, and (4) superior rectus. Recovery appeared to be spontaneous and not related to any measure of treatment.

Anatomical diagnosis.—The lesion may have been single, or there may have been two or even more lesions. In this connection, if a single lesion localized in the anterior part of the oculomotor nucleus is supposed, the difficulty arises that the fillet was spared yet the cortico-facial fibres were involved. The objection may be raised that the examination of the sensory functions was incomplete, and that the negative sensory findings should not be admitted as valid evidence, and further almost any lesion of the nerve tissue may by adjacent œdema spread its effects beyond its gross margin. On the other hand, the well known tendency of purpuric spots in the skin to appear in crops should be borne in mind, so that by analogy a multiple lesion is not improbable. The assumption is made, therefore, that the main lesion was in the oculomotor nucleus but that a subsidiary one was present in the pyramidal fibres which control the movements of the face.

The ophthalmoplegia was probably nuclear, as Dr. T. H. Whittington pointed out at the time, because of the disturbance of convergence of the sound eye. The anterior part of the nucleus may be safely assumed to be the region involved, for, above all the controversy as to the allocation of function amongst the various cell groups of the nucleus, the sphincter pupillae and ciliary muscle are admittedly innervated by the anterior end. If on the other hand an intra-cerebral lesion of the fibres below the nucleus is assumed, it would have to be before they are gathered into a compact bundle; at first sight, involvement of the red nucleus (which is traversed by the strands of the oculomotor nerve) is an attractive theory, especially in view of the slight ataxia of the contra-lateral arm, but would not account for the weakness of convergence in *both* eyes.

Nature of the lesion.—On grounds of probability this would appear to have been a minute hæmorrhage, purpuric in origin. Cerebral hæmorrhage is a well recognized occasional cause of death in purpura both "primary" and symptomatic. As Dr. H. Thompson Barron pointed out, purpuric lesions of the brain may well be commoner than is usually supposed, for they are easily overlooked in a very ill patient and, further, the brain is not always examined carefully at autopsy.

The blood showed a varying degree of secondary anæmia with a low colour index: Red corpuscles, 3,500,000; hæmoglobin, 60 per cent.; colour index, 0·85; red cells pale with mild anisocytosis. Diffuse and punctate basophilia present. The leucocytes were not significantly abnormal in number or type in any of the counts performed. The clotting time was always approximately normal, the bleeding time prior to splenectomy always increased, as is commonly observed in purpura. The following are the platelet counts at different times :—

November 29, 1932 - - -	25,000
February 10, 1933 - - -	28,000
March 22, 1933 - - - -	125,000

May 9th, 1933	67,000
[June 27th, 1933	Splenectomy]
July 6th, 1933	158,000
July 17th, 1933	102,000
July 24th, 1933	120,000
August 21st, 1933	400,000
November 9th, 1933	170,000
January 20th, 1934	165,000

Capillary-resistance test.—This test was performed frequently by Dr. Bernard Myers who insists on the importance of a positive test as well as of thrombocytopenia and increased bleeding time as an indication for splenectomy in the treatment of purpura.[2] The results of the tests were repeatedly negative until March 23rd, 1933, when it was noted to be positive for the first time. The test was thereafter positive occasionally.

Splenectomy was performed by Mr. Rodney Maingot on June 27th, 1933. Thereafter the hæmorrhages into the skin and from the nose ceased, and the child has since remained well and free from symptoms. Previous treatment by blood transfusion, sunlight, and other methods did not have any lasting influence on the course of the disease.

In conclusion, my thanks are due to Dr. T. H. Whittington for his opinion on the ophthalmic signs, and to Dr. Bernard Myers for his help and advice on many points, especially in regard to the vital question of treatment. To Dr. Knott I am indebted for the numerous blood counts which he performed.

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MEDICO-LEGAL PROBLEMS IN GENERAL PRACTICE*

VI.—RADIOLOGY IN RELATION TO MEDICAL JURISPRUDENCE

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BEFORE the advent of X-rays the knowledge of congenital deformities of the human skeleton, apart from gross deformities, such as supernumerary fingers and toes, was limited to those found accidentally by anatomists in the course of dissection of the human body. As these variations, in many cases, consist of but very small extra ossicles or bone elements buried in soft tissues, such as muscle, or in tough ligaments and tendons, it is not surprising that the majority of them remained undiscovered until it became possible to utilize the X-rays for their detection. It can therefore be easily understood why the list of known skeletal variations has grown rapidly during the last few years, and although, to the majority of practitioners they are still only of academic interest, the whole subject becomes one of very great significance when considered in relation to the Employers' Liability and the Workmen's Compensation Acts of 1906 and 1925. In medico-legal cases evidence of fracture of a bone now almost entirely depends on the radiographic findings; correct interpretation of the radiographs is therefore essential, and it becomes of paramount importance that the radiologists should be familiar with all those skeletal variations and conditions that may simulate or mimic fractures.[1] A small extra ossicle (*see* Fig. 1), while of little consequence in general medicine, may, by being mistaken for a fragment of bone fractured or torn off as the result of trauma, mean the payment of large sums for compensation, to which the patient is in no way entitled. In fact, it is probable that many thousands of pounds are being disbursed unnecessarily by insurance companies, owing to many of these congenital variations being incorrectly diagnosed as caused by injury. In this country alone there are annually some 400,000 accidents to workmen, involving payments under the Workmen's Compensation Act amounting to close on £12,000,000, and it may be assumed that in a large proportion of these cases fractures and other injuries were involved which would require the use of X-rays in their diagnosis and treatment.

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* This is the sixth of a series of articles on this subject, to which other medico-legal authorities will contribute in succeeding numbers of *The Practitioner.*

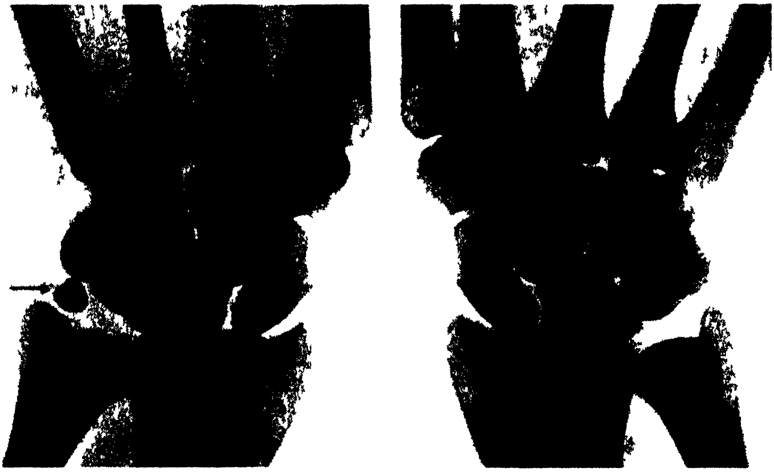

FIG. 1.—Extra ossicle of left wrist marked with arrow.

Radiology in relation to medicine is a specialized subject, and as such is not yet universally included in the medical curriculum. As a consequence, the majority of medical practitioners cannot be expected to have more than a very superficial knowledge of the subject, and, what is of even greater importance, they are not, and in fact cannot be, aware of the many pitfalls and difficulties with which this branch of medicine is beset.

Interpretation of radiographs.—Many medical practitioners consider the radiological examination quite satisfactory so long as the radiographs are technically good. This is a fallacy, for the interpretation of a radiograph by a practitioner with little experience or knowledge of the subject may be useless or even worse than useless, however satisfactory the radiograph or simple the case. Technically good radiographs are, of course, essential, but correct diagnosis is after all the most important aspect of the whole examination.

Anyone who has had the experience of listening to the various and diverse interpretations of the same radiograph given by different medical practitioners will realize that, although the radiograph cannot lie, the interpretation of the shadows imprinted thereon may lead to considerable divergence of opinion. Each will point to definite indications as justifying his diagnosis, indications which may be valueless to the trained observer. So, although there are definite shadows imprinted on the radiograph, their true values and significance require the interpretation of an experienced radiologist, a point which cannot be too strongly emphasized. The difficulties of interpretation have increased in relative proportion to the improvement in apparatus and technique. It is now possible to obtain such a wealth of detail in the radiograph that slight variations from the normal which, only a few years ago, escaped detection owing to the inferior quality of radiographs, have become obvious and must be recognized as such.

It has fallen to most radiologists, in the course of their routine hospital work, to note how frequently these skeletal variations occur, and how extremely difficult many of them are to differentiate from fractures. These might be, and in fact have been proved to be, veritable gold mines to patients, when it happened that at some time it became necessary to examine this particular region for injury. To the unscrupulous it certainly opens up a new and profitable field of exploitation, once they realize that they possess some physical abnormality which readily deceives the eye of the practitioner without specialized knowledge.

An example of how money may be extracted from Insurance Companies was disclosed in a recent prosecution. The man had a congenital deformity of the clavicle, by means of which he was enabled to impose on doctors and others in a series of imaginary accidents. In the course of the case it was stated that he had practised this type of fraud for a number of years, and had victimized Insurance Companies to the extent of £2,300.

Legal points.—A report on the radiographic examination of a case in which legal action may be involved requires special care in its preparation. Long rambling statements, featuring negative findings, should be avoided, as such documents are eagerly seized upon by the opposing counsel. Every statement should be carefully weighed and worded, and all ambiguity avoided. The importance of keeping strictly to the radiographic findings need hardly be emphasized; it is also advisable not only to have a copy of one's report at hand when giving evidence, but to memorize its contents. A slight departure from the original may be seized upon by the opposing counsel for effective cross-examination designed to discredit the evidence. Do not include anything in the medical report that cannot be substantiated in the witness-box.

To the medical practitioner, legal procedure usually appears lengthy and involved. He will be well advised, however, to follow all the evidence carefully, at times suggesting to counsel questions which might with advantage be put to the opposing medical witness or radiologist. Before entering the witness-box, he should have his report and radiographs arranged in order, and the facts of the case clearly before him. He must not forget that he is in the witness-box essentially as a radiologist. The temptation to stray beyond his sphere—a temptation readily encouraged by a clever counsel—is often difficult to resist. A counsel may also encourage an inexperienced medical witness into displaying his acumen—with the object of involving him in difficulties of his own creation. It should not be overlooked that counsel is usually well informed on the medical aspect of the case which he is presenting. In certain circumstances the production of a normal radiograph for comparison may be of considerable value to the judge and medical assessor in appreciating some obstruse radiological point. This contingency must have been previously arranged for. The judge's permission must, however, be obtained to produce this additional radiograph.

The desirability of preparing reports carefully has been mentioned already. It must be remembered that the judge not only wishes to hear all the evidence, but has frequently to take it down in longhand. Considerable irritation is therefore avoided if the witness takes a little trouble to deliver the evidence in clear and audible tones, with perhaps a slight pause at the end of each sentence. Highly technical terms should be as far as possible avoided. Occasionally an unfair question may necessitate an appeal to the judge. Above all, the radiologist will do well not to allow himself to become argumentative or to lose his temper. Having made up his mind before giving evidence as to the condition of affairs displayed by the radiograph, he should not allow himself to be tempted in cross-examination into any controversial argument.

Medical negligence.—Legal action is occasionally brought against medical men on the ground of negligence in dealing with or treating a fracture case. The medical difficulties in treating a complicated fracture cannot always be appreciated by lay persons or by members of the jury responsible for the verdict. What may be considered by medical men a very satisfactory result may be—in fact, often is—looked upon by these critics in quite a different light.

The Medical Defence Union and other medical defence societies now advise their members that *every case* of fracture or suspected fracture must be radiographed. If the patient or those responsible object to this procedure, on whatever grounds, the practitioner in charge must obtain the refusal in writing, otherwise the society may refuse to defend the case, should an action be brought. It must be remembered in this connexion that the radiograph of a fracture may, from faulty technique, exaggerate any displacement of the fragments and give a wrong impression of the actual condition. The unscrupulous may deliberately make use of this factor.

The medical assessor.—Without doubt, the presence of a medical assessor on the Bench is of considerable importance in medico-legal cases. The interpretation of radiographs is especially apt to give rise to conflicting medical evidence. This is not surprising when the complexity of the examination is taken into consideration. While the medical assessor is always a man with medical knowledge and experience, he can scarcely be expected to possess an extensive acquaintance with radiology or to be familiar with its numerous pitfalls, such as congenital variations or technical errors. And it frequently happens that his opinion or judgment of a case rests almost entirely on the interpretation of the radiograph. The conflicting opinions expressed by the opposing medical men, or, in some cases, opposing radiologists, do not make his position easier. As a means of safeguarding insurance companies and the plaintiff against an unfair decision, it would seem advisable, where difference of opinion exists as to the correct interpretation of radiographs, that a consultant radiologist be asked to give his independent decision, which decision should be final.

Reference

[1] Scott, S. Gilbert: "Radiology in Relation to Medical Jurisprudence." London, Cassell & Co., 1932.

CORRESPONDENCE

THE CARE OF THE FEET DURING AN ILLNESS

SIR,

I should like to call attention to some practical points in the care of the feet, which should prove useful to general practitioners. If anything goes wrong with the feet during or after an illness a man may be severely crippled for the rest of his life and all his activities may be affected. During an illness there is often much wasting of the muscles, which may be the general result of the disease as is seen in influenza and many acute fevers; but loss of tone in the muscles may follow even a short stay in bed. The feet tend to drop and the condition known as talipes decubitus due to contraction of the calf muscles may supervene. For this reason a nurse or the person in charge of the invalid must move the feet and toes through their full movement at least twice a day no matter how ill the patient may be. But even when this is done there is often some aching of the feet when exercise is resumed. This is due to the muscles not having been exercised. As a result the ligaments become stretched when weight is borne. Most of this can be prevented by a little care. As soon as the acute stage of an illness is over, active contraction of the muscles with full movement of the joints of the feet should be carried out at least twice a day. This particularly applies to the muscles that bring the foot up to a right angle and that invert it. During the acute stages the patient was rightly told to do as little as possible. He is rather apt to continue to do this and to wait until he gets up before starting any exercise. This is a mistake. He should be given every encouragement to move the legs and not to lie listless long before this takes place. When he is getting up he should be supplied with a pair of shoes with the heel raised a third of an inch on the inside and prolonged forwards for ¾ inch, and the sole raised a third of an inch on the inner side, the so-called crooked and elongated heel and the inside flapper. All the boots and slippers should have this alteration for the first few months. The ordinary bedroom slippers should be for a time discarded. When standing he should rest with the feet a little inverted so that his weight comes on the outer border. And when walking he should at times keep the toes a little turned inwards; this helps to develop the muscles that control the instep. As there is certain to have been some wasting of the feet, the boots will often be found to have become a little too large. A sock in them will be most comforting. Attention should be given to the socks, for they will have been put aside for many weeks. Like woollen underclothing in general, for some reason that is not apparent, they do not improve by not being worn, for they seem to go on shrinking. As a result they are apt to cramp the feet. Many of the maladies of the feet that follow an illness are due to the socks being too tight. If the feet ache after coming in from a walk it is advisable to change the socks. At such a time raising the feet on to a chair or on a foot stool is often very soothing. Bathing them in warm water is very beneficial and the addition of bath salts help to remove the feeling of fatigue; though 10 per cent. solution of Epsom salts (commercial preparations act quite as well as the purified) does equally as much good. If the aching continues they may require toning up. Massage combined with active movement of the muscles is very useful. An equally good procedure is to get two buckets of water, one containing water as hot as the feet can stand, the other as cold as possible. The foot is immersed in one for one minute, and in the other for another. This is done twenty times night and morning.

Cardiff. T. E. HAMMOND, F.R.C.S.

THE TREATMENT OF NERVOUS DYSPEPSIA

SIR,

Although I know there is nothing new in combining tincture of belladonna with a bromide and an alkali, I have found the following prescription so useful in a number of cases of marked loss of appetite and loss of weight, of venous origin, that it may be worth while to print it for the benefit of other practitioners :—

℞	Pot. brom.	gr. v
	Tr. bellad.	♏ v
	Sod. bicarb.	gr. xv
	Syr. aurant	♏ xv
	Aq. menth. pip. ad	℥ss

Sig.—℥ss t.i.d.p.c. et nocte.

It is hardly necessary to say that, of course, neoplasm must be definitely excluded in these cases, by X-rays or other examinations.

Belfast. H. S. MAXWELL, L.R.C.P. and S.ED.

THE TREATMENT OF FUNCTIONAL ENURESIS

SIR,

Regarding Dr. Wilfred Sheldon's article on " Some aspects of enuresis " (*The Practitioner*, April, 1834, cxxxii, 475), I should like to mention ephedrine hydrochloride in the treatment of functional enuresis. It was first suggested to me when an asthmatic patient complained of temporary difficulty in micturition, among other symptoms of ephedrine idiosyncrasy. In quite a few cases where I have failed with fairly big doses of belladonna, I have succeeded with ¼ to ½ gr. of ephedrine hydrochloride last thing at night. This action of ephedrine can be easily explained by sympathetic stimulation.

Burton-on-Trent. M. GHOSH, M.B.

BEE VENOM IN THE TREATMENT OF RHEUMATISM

X.Y.Z. (London, S.W.1) having written to ask if any information could be given regarding the stings of bees as a cure for, or a palliative of, rheumatism, the inquiry was referred to Dr. MATTHEW B. RAY, who replied as follows :—

Apicosan (Wolf) is a standardized solution of bee toxin especially prepared for intradermic injection. Intradermic injection is considered to give better results to hypodermic introduction. It has been noted bee-keepers rarely suffer from rheumatism—how far this is true it is impossible to say. Burton (*Brit. Med. Journ.* 1908, ii, 1369 and 1678) describes in detail the method he adopts in submitting rheumatic patients to the sting of a bee. C. S. Maude has written a short monograph on " Bees and Rheumatism," in which he states that the active principle of the bee sting poison is a non-nitrogenous substance. No formic acid is present. The bee sting is not poisonous to man and Maude thinks the fluid from the bee has antiseptic qualities as it is slightly acid in its reaction. On the other hand the sting from a wasp—as it is a dirty feeder—may become very septic; a bee is a clean feeder and is only found on flowers. He further points out that bees will sting one person and not another. It is a well-known fact that some men handle bees with unprotected hands and not wearing a " bee-veil." From that he argues that the bee will only sting a rheumatic subject, and at times will even chase them a long way. He suggests that a rheumatic subject has a peculiar sour odour of the skin. In the experience of the writer, some very striking results have followed the applications of either stings by bees direct or by the use of the substance (apicosan) mentioned above. Other cases again appear to be quite unaffected one way or another. Most observers are agreed that sciatica and brachial neuritis show the best results. Articular rheumatism does not seem to be much benefited. In all cases of intractable sciatica or neuritis in any other situation the treatment is well worth a trial. The following are further references in recent literature :—

Fehlow, W.; *Deutsche med. Wschr.*, 1932, lviii, 334.

Roch, M.: " Use of bee venom in Sciatica," *Rev. méd. Suisse Rom.*, 1933, lii, 84.

Perrin, M., and Cuenot, A.: " Bee Venom," *Rev. méd. de l'Est*, 1933, lxi, 261.

VON BONSDORF'S SIGN IN TUBERCULOSIS

M.D. (Northampton) having inquired about von Bonsdorf's sign in tuberculosis, about which a search of the usual authorities had revealed no information, the query was referred to Dr. L. E. HOUGHTON, who replied as follows :—

Von Bonsdorf's sign depends on counting the lobes of the nuclei in polymorphs. One examines the first 100 polymorphonuclear leucocytes in a blood film and counts the lobes; normally the average is 275 lobes in 100 leucocytes. In tuberculosis this number is said to be reduced, but this is also true in other toxæmic conditions.

RECENT ADVANCES IN THERAPEUTICS

THE TREATMENT OF PNEUMONIA

In an attempt to evaluate the efficacy of the various agents and means available to combat pneumonia, it must be emphasized that the various types of pneumonia are distinctly different. Furthermore, the course and mortality rate in any given type of pneumonia undoubtedly are influenced by the variable virulence of the infecting organism and the natural resistance of the individuals at the time of infection. Environment likewise plays a very important part which cannot be overlooked. With regard to more specific measures in the treatment of pneumonia, the greatest strides have been made in the development of anti-serums. The original work with the anti-serum was done by Neufeld and Händel in Germany, but the anti-serum did not become generally used because it was difficult to produce, and because a large volume of horse serum had to be injected in order to obtain sufficient units of anti-serum to give benefit, and serum sickness frequently followed. With the improvement in production devised by Felton, the anti-serum is again widely used. It is the concensus of opinion that it is of definite value in the treatment of lobar pneumonia, and that it will reduce the mortality rate to approximately half that in untreated cases. In order to obtain benefit from the serum, however, it is necessary that it be given within the first three days of the disease, and within the first forty-eight hours, if possible. As the serum is specific, it is necessary to determine the type of the infecting organism. Another procedure that is available in the treatment of pneumonia is the use of oxygen. This has been found of value in all types of pneumonia. Although theoretically it should have its greatest value in the early stages of the disease, it will be found to be of benefit at other times. It is especially of benefit during the stage of pulmonary œdema and congestion, by decreasing anoxæmia. A combination of carbon dioxide and oxygen has been advocated by Henderson and his co-workers in the prevention and treatment of post-operative atelectasis and pneumonia. Its action is that of increasing pulmonary activity and circulation. Although it is of benefit, it has failed to solve the post-operative pulmonary complications. It also has been used in other types of pneumonia, with very uncertain results. The use of diathermy, various types of lamps, Rœntgen rays and other electrical appliances, has attracted attention from time to time. The benefit to be derived from their use is debatable; it probably is as much psychological as physiological. Bronchoscopy has been advocated in the treatment of pneumonia, to enable removal of obstructing plugs, to prevent atelectasis and to assist in bronchial drainage. There is evidence that it is of value, especially in treatment and prevention of post-operative pneumonia. In broncho-pneumonia, in which it should be of greatest value, many other and less strenuous methods are available and give excellent results. Chemotherapy is the field of greatest interest and speculation, and on which the literature has recently been most voluminous. The list of drugs advocated in the treatment of pneumonia is indeed an imposing one. Such drugs as ethylhydrocupreine, veratrum viride, mercurochrome, digitalis, quinine, sodium cacodylate, the coal-tar products, and many others have had their period of favour followed by periods of eclipse or disuse. Plasters and pastes have had considerable use. The very magnitude of the growing pharmaceutical list indicates the absence of any outstanding drug. Many practitioners use some particular drug that they feel, in their hands, is of definite value. If so, it would be advisable to keep to it, provided it does no harm. Recently, at the Mayo Clinic, H. J. Moersch (*Proceedings of the Staff Meetings of the Mayo Clinic*, March 28, 1934, ix, 187) has used ergot in the treatment of pneumonia. Ergot is not new in the treatment of this disease, as records of its use have been found as far back as 1858. The early reports were encouraging, but for some unknown reason, perhaps due to the fact that it was not generally appreciated that ergot will deteriorate with time and lose its efficacy, reference to its use in pneumonia disappeared from the literature about thirty years ago. The action of ergot in pneumonia is not known, for its exact physiological action on the pulmonary circulation is uncertain. It has been thought to constrict the pulmonary vessels, thereby making them less permeable, and preventing the ready passage of fibrin into the alveoli. Furthermore, in the presence of constriction of pulmonary vessels, pulmonary toxins would not be able to pass as readily into the general circulation. If the drug returns to use for pneumonia, the most efficient dose, form and method of administration will have to be established. The fluid extract of ergot and ergotole have been used by the author. The latter is a sterile preparation which can be given either by mouth or subcutaneously, and is also thought to produce less nausea than the usual preparation. The dose has varied from 15 to 40 minims every one to two hours for twenty-four hours.

THE TREATMENT OF MUCOUS COLITIS

A. F. Hurst said (*Proceedings of the Royal Society of Medicine*, April, 1934, xxvii, 677) that when he was invited to open a discussion on the treatment of mucous colitis he was at first inclined to reply: " There is no such thing as mucous colitis, so I cannot open a discussion on its treatment." On reconsideration, however, it occurred to him that he might instead attempt to explain why he objected to the diagnosis of mucous colitis and at the same time point out what disorders of the colon seemed most suitable for physiotherapy. The most common chemical irritants of the colon were purgatives. As they led to purgation by irritating the colonic mucous membrane, they naturally also called forth an excessive secretion of mucus, which contained no leucocytes or red corpuscles, and endoscopy showed no abnormality in the appearance of the mucous membrane. The mucus protected the mucous membrane so efficiently that actual colitis only resulted when very large doses of purgatives had been taken for very long periods. In such cases the diarrhœa induced by the purgatives persisted when their use was discontinued. It was clear, therefore, that excess of mucus with soft or liquid fæces in a patient taking aperients did not justify a diagnosis of mucous colitis. Another common cause of chemical irritation of the colonic mucous membrane was the use of irritating suppositories, enemas and douches. Glycerine suppositories and enemas, though useful under exceptional conditions, always called forth an abundant secretion of mucus, unaccompanied, however, by any evidence of proctitis. Soap enemas and all kinds of medicated enemas and douches gave rise to similar, but often less intense, irritation. Most natural waters used for douching at spas had also a slightly irritating action, though, if isotonic, this might be negligible. Normal saline solution was almost the only fluid which did not as a rule stimulate the secretion of mucus. Very exceptional cases of true mucous colitis did exist, in which the patient passed liquid stools mixed with excess of mucus, containing excess of leucocytes and sometimes a few red corpuscles, and in which the sigmoidoscope showed that inflammation was present, though not sufficiently severe to be regarded as an early stage or a mild form of ulcerative colitis. There were, however, many men and women with uncomfortable colons, colons which were organically normal but functionally inefficient; these patients were very difficult to treat by drugs alone; their condition was often the result of abuse of aperients, occasionally the abuse of enemas, and a similar irritable colon was a very common sequel of intestinal infections, especially those contracted in the tropics, and might persist for years after the specific dysenteric or other organism has disappeared from the bowel. Muco-membranous colic and the various forms of colon spasm, which were not secondary to some organic disease, such as ulcerative colitis or diverticulitis, might be included in this group. All such cases were suitable for physiotherapy.

Geoffrey Holmes of Harrogate said he had on several occasions seen cases of mucous colitis improve wonderfully after a bismuth meal or barium enema given for X-ray purposes. It did not appear to be generally known that bismuth salts when given with a sufficient quantity of bromide did not cause constipation. He had found ten grains each of bismuth salicylate and bismuth subnitrate, suspended in a mixture with fifteen grains of potassium bromide and a little sal volatile, taken three times daily before meals, most effective in relieving gastritis and colitis accompanied by general abdominal tenderness and spasm of the colon. The comparatively few cases of early mucous colitis which had come under his care all cleared up satisfactorily with rest, warmth, a bland diet and prescriptions similar to the above. In the more chronic cases the patients usually tolerated a diet containing a fair amount of roughage and both the general health and the condition of the colon improved more quickly on an all-round diet than on a milk and farinaceous diet, which has not infrequently been adhered to until the patient had become anæmic. The drugs he had found most useful were bromides, belladonna, hyoscyamus and codeia as sedatives and antispasmodics, and kaolin and salicylates for their detoxicating properties. The great majority of his cases were treated, however, with saline sulphur waters, internally and for intestinal lavage. The things that mattered most in giving intestinal lavage were the composition, temperature, amount, pressure and frequency of the injection and the skill of the person administering the treatment. The volume of the injection was very important and it should be a rule to check the flow immediately when pain was felt. It had been said that intestinal lavage was more likely to cause than to cure colitis. While this might be true when irritating substances such as soap and turpentine were used in enemas, or when the technique of administration was faulty, intestinal lavage with suitable waters followed by warm immersion baths with hyperthermal under-current douching was often most helpful in clearing up the condition in obstinate cases.

THE SELENIDE TREATMENT OF CANCER

A. T. Todd, who is assistant physician to the Bristol Royal Infirmary, has published (*British Journal of Surgery*, April, 1934, xxi, 619) an article on the selenide treatment of cancer. He reports two series of cases, the first consisting of 93 cases, of which 18 dropped out for various reasons, 5 cases are still receiving treatment, leaving 70 to which treatment was given. Of these 70 cases, 23 had quite inadequate treatment, the average duration being only 6 weeks; that is, they were extremely advanced cases which would not have been accepted if any selection had been made. If they are excluded, there remain 47 cases in which treatment has been adequate; in 29 cases treatment has failed in the end, and all are dead. This leaves 18 cases, of which 15 are discharged as apparent cures. Then 3 cases, apparent cures, have died from influenza in 2 instances and street accident in 1, in which autopsy disclosed no growth. That is, of the whole series, apparent cure has resulted in 20 per cent. Excluding the cases still on treatment and those which gave up, the figure rises to 26 per cent. If only the cases which received adequate treatment are counted, the figure rises to 38 per cent. Series two, of those treated since September 1932, is more difficult to assess; there are 62 cases. Selection has been made, but only as regards mentality and ability to attend. Of these cases 12 have started treatment too recently for any decision to be made. Then, in spite of the selection, 7 cases dropped out; one was doing reasonably well. Inadequately treated cases number 15, average duration of treatment being 4 weeks. This leaves 28 cases to which adequate treatment has been given. Of these, 12 are dead, 4 are still receiving treatment, but are doing badly; 9 are doing well, amongst them being several who are being observed prior to discharge; three cases have been discharged as apparent cures. That is, the results are at least as good as in first series. Todd states that these figures do not give quite a true picture of the results, for many of the cases reported as failures showed some good results. The idea behind Todd's work is that the defensive mechanism of the body against a neoplasm can be stimulated by colloids combined with radiotherapy. The technique which he employs is described by him as follows: The patient is warned that treatment will be prolonged, extending over years, if the result is favourable; a weekly attendance will be necessary. If he cannot engage to do this, then he is not accepted for treatment. Carcinoma of the alimentary tract with hepatic metastases is only accepted if the primary is capable of removal, for while primary colon requires high dosage, hepatic metastasis requires low dosage. Other than this, no selection is made, and until recently no selection whatever was made. Every case has to be guaranteed untreatable and to be free of diagnostic doubt. When surgical removal of a reasonably large part of the mass is regarded as a fairly safe procedure, the patient is referred back to the surgeon for what is called the "toilet operation"; this is especially desirable in septic fungations, for sepsis causes false reaction and one is impeded in assessing true reactivity. Next, tests of blood and reactivity, purely for research purposes, are made, and then the patient is started on the medicinal and other treatment. Each patient takes $\frac{1}{10}$ gr. of dry thyroid extract once daily; three to six drops of radiostoleum daily; three doses of mist. calci. thiosulphate (sol. calc. thiosulphate, 50 per cent., min. 40; glucose gr. 20; inf. caryoph. (1–7) half fluid oz.; water to one fluid oz.; this replaces the older mist. calci. chlorid. alb.) plus 5 gr. of sodium iodide after meals. If pain is experienced, the patient is given aspirin, tab. amidopyrin co. (B.D.H.), allonal, or the other analgesics, the morphine group excepted. As a last resort heroin is given, but few cases respond unless its administration can soon be stopped. Many of the patients have been on large doses of morphine before they come to hospital; as a rule the patients are soon able to discontinue it. The radiologist is asked to give a time for treatment, and approximately forty-eight hours before this date an intravenous injection of SSe. (a new colloid of selenium and sulphur manufactured by British Drug Houses, Ltd.) is given. The amount of the initial dose varies with the size of the patient and the type of neoplasm. After forty-eight hours the patient is radiated, and the first treatment is over the main mass, or, if pain is present, over the painful part. The dose is repeated weekly until 12 Holtznecht units have been given. After each application X-ray reaction is looked for; if it is marked, the dose of X-rays is reduced the next time; if not present, and the colloid reaction was adequate, the X-ray dose is increased. When the first ionization course is over the patient begins alternation of colloids. For the first three weeks he is given R.A.S. (a feebly radio-active selenide colloid), the first dose being about two-thirds the amount of his last dose of SSe. If marked reaction follows, the second is lessened. After this three weeks, he has alternately one week SSe. and the next R.A.S. This alternation is to permit a slow progressive ionization from the radiation of the R.A.S. If progress is in doubt, or signs of extending growth appear, he is again started on ionization from X-rays. If progress appears to be satisfactory, alternation continues, and after nine months no colloids are given. So far, no discharged case has ever returned with active disease of the type originally treated.

REVIEWS OF BOOKS

The Anæmias. By JANET M. VAUGHAN, D.M., M.R.C.P. With Notes on Normal and Pathological Erythropoiesis by HUBERT M. TURNBULL, D.M., F.R.C.P. Oxford Medical Publications. London: Humphrey Milford, 1934. Pp. xii and 248. Illustrations 24. Price 12s. 6d.

THIS is a most valuable and timely review of modern knowledge on the rapidly changing subject of anæmia, based on nine years' work and presented with a wise absence of dogmatism. This asset is increased by the collaboration of Professor Turnbull, who has contributed much from his store of pathological experience. After his account of the anatomy of normal erythropoiesis based on examination of the red marrow in the femurs in no less than a hundred and twenty-nine apparently healthy subjects killed accidentally, Dr. Janet Vaughan deals with the difficult problem of the classification of the anæmias; the recognized three main divisions of anæmia, due to (i) failure or abnormality in production, termed here dyshæmopoietic, (ii) excessive loss of blood, and (iii) excessive hæmolysis, are subdivided up into a large number of groups. Thus the section devoted to the unexplained dyshæmopoietic anæmias begins with an account of idiopathic aplastic anæmia which Professor Turnbull, in his description of the morbid changes, considers covers cases of different etiology having in common a loss of red bone marrow, but the reduction is less microscopically than would appear probable from naked eye examination. This division of unexplained dyshæmopoietic anæmia also contains a sub-section " erythroblastosis fœtalis," which includes congenital hydrops fœtalis, congenital anæmia of the newborn, and icterus gravis neonatorum; the last has now, mainly as the result of the work of L. G. Parsons and his colleagues at Birmingham, been shown to be characterized by a high proportion of immature red cells in the blood, and to be, as acholuric jaundice was years ago proved to be, a disease of the blood-forming organs and not of the liver. The account of the hæmolytic anæmias contains an admirable description of acholuric jaundice, of which the author has examined eighteen cases in ten families; the morbid anatomy is exhaustively considered by Professor Turnbull. It is pointed out that it and sickle cell anæmia may in the future, as has Addisonian pernicious anæmia, have to be transferred from the hæmolytic to the dyshæmopoietic anæmias. The last chapter is devoted to the two unclassified anæmias—splenic and von Jaksch's anæmia. Although in this review attention has been directed to the fundamental questions of pathology and classification, the practitioner will find that the practical aspects of diagnosis and treatment are presented with equal efficiency.

The Relief of Pain in Childbirth. By F. NEON REYNOLDS, M.C.O.G., F.R.C.S.E. London: Medical Publications, Ltd., 1934. Pp. 114. Price 10s. 6d.

DURING the last five years great attention has been paid to the subject of relief from pain during labour and it behoves everyone practising obstetrics to do all that he can for his patient in this direction, for it will be, almost entirely, from this angle that his obstetric skill will be judged in private practice. Efficient ante-natal care will do much to prevent the pain of a long labour, a point not emphasized in this book, but the various drugs which may be used during the first and second stages have been carefully analysed by the author, the advantages and dangers of each considered, so that the result of a great deal of research work is presented in a small volume and in a most helpful and practical way. Doubtless the author considers the time honoured "potassium bromide and chloral hydrate" inefficient, but as it is by far the commonest method used in the first stage, his readers would have valued his opinion, if only for the sake of comparison with other methods advocated.

X-Ray and Radium Injuries: Prevention and Treatment. By HECTOR A. COLWELL, M.B., PH.D., and SIDNEY RUSS, C.B.E., B.SC. Oxford Medical Publications. Oxford University Press London: Humphrey Milford, 1934. Pp. xi and 212. Price 14s.

THIS authoritative work by a medical man and a physicist, both with long experience in radiology, meets a very distinct need, for there is not any book dealing fully, as this does, with the characters, the prevention and the treatment of injuries caused by exposure to X-rays and radium. After Roentgen's discovery of X-rays in 1895 it was not long before their harmful effects became known; but many of the early pioneers were permanently damaged before the full extent and gravity of the lesions became recognized. It was not until 1922 that the means of adequate protection were standardized, and this information and further skilled advice on this subject rendered widely available by the X-Ray and Radium Protection Committee. This volume is most appropriately dedicated by his two friends to the late Dr. Stanley Melville who started the Protection Committee and, with Professor Russ, was the honorary secretary until his death which took place just before this book was published. The harmful effects are fully described under the headings of the various systems and organs of the body; that on the cutaneous lesions is naturally long, and contains the late Dr. Hall Edwards' autobiographical account of his long and intense suffering. The account of the changes in the generative organs is also exhaustive and contains a section dealing with the effects of radiation on the offspring of women X-ray workers, and one on the occurrence of sterility on male X-ray workers, which may be temporary. The last Chapter in the book is on X-ray and radium quackery which has been followed by misadventures, such as facial telangiectases, in persons treated for freckles, acne, and hairiness of the face in American "beauty shops." In an appendix the recommendations of the X-Ray and Radium Protection Committee are abstracted.

Essays on Chronic and Familial Syphilis. By GRIFFITH EVANS, M.A., D.M., F.R.C.S. Bristol: John Wright and Sons, 1934. Pp. 91. Figs. 13. Price 7s. 6d.

BASED on practical rather than on laboratory experience the author insists on the importance of syphilitic infection, especially when latent and otherwise far from obvious, in the causation of other and serious conditions. The absence of a positive Wassermann reaction in

50 per cent. of latent cases is too often regarded as eliminating the root cause of symptoms, and evidence is brought forward to show the frequency with which digestive disturbances occur in latent syphilis; these cases respond to anti-syphilitic treatment unless inflammatory irritation of the nerve ganglia has gone on to fibrosis; but the symptoms, which may imitate peptic ulcer, do not yield to ordinary treatment. He argues that achalazia is syphilitic in origin and that cancer is a common termination of latent syphilis. Syphilis is regarded as a pre-cancerous state and the *Treponema pallidum* should be recognized as a carcinogenic agent and in the same light as shale oil.

Ultra-Violet Therapy in Eye Disease. With a review of the action of other forms of radiant energy. By FRANK W. LAW, M.A., M.D., B.Chir., F.R.C.S., London: John Murray, 1934. Pp. 78. Price 5s.

IN the introduction to this monograph the author summarizes the physical properties of the electro-magnetic waves concerned in "radiant energy." As Medical Officer in charge of the Physico-thereapeutic department at the Royal London Ophthalmic Hospital he has enjoyed special experience in ultra-violet light therapy for certain diseases of the eyes. He describes the technique in general and local phototherapy, gives case records and surveys the results and conclusions to be drawn from these. The value of this treatment is critically reviewed and although his observations are tinged with a wholesome scepticism they show a realization of the value of this treatment in certain ocular disorders. In the section dealing with "radium rays" the author legitimately doubts the extravagant claims of certain observers, but his statement that "experiments go to show that radium is of value in the treatment of tuberculous lesions of the conjunctiva, cornea and iris" should be received with some reserve. The experimental work in connection with the effect of X-rays on the eyes, particularly the irradiation of developing eyes *in utero*, is briefly described, and there is also a short account of the clinical application of X-rays in certain ophthalmic disorders and their pathogenicity. The effects of infra-red rays on the eyes are briefly discussed in the last section of this work.

The Dermatergoses or Occupational Affections of the Skin. By R PROSSER WHITE, M.D. Fourth Edition. London: H. K. Lewis and Co., 1934. Pp. xvi and 716. Figs. 72 on 66 Plates. Price 35s.

THIS standard work, describing the trade processes, the responsible agents and their actions, first came out in 1915 and the final proofs of this edition were read by the author a few days before his death. The publishers have inserted a pleasing portrait and a sympathetic memoir of the author by Dr. W. E. Cooke, his colleague at the Royal Infirmary, Wigan. The term "dermatergoses" signifies skin diseases due to work, a subject on which Prosser White had a most extensive knowledge and experience. This is an encyclopædic source of reference and must long hold the field in this respect; it is exhaustively documented, and provided with two hundred and seventy pages of index which being synoptical in form gives information which often renders reference to the text unnecessary. This volume supplies an emphatic negative to a paper written by the author in 1922 under the title "Do we neglect the industrial skin sufferer?" for nearly every page has about half a dozen footnote references to papers by dermatologists and others.

The Science of Signs and Symptoms in Relation to Modern Diagnosis and Treatment. By R. J. S. McDowall, D.Sc., M.B., F.R.C.P.E., assisted by H. A. Dunlop, M.D., M.R.C.P. Third Edition. London: William Heinemann (Medical Books), Ltd., 1934. Pp. xv and 542. Illustrations 11. Price 21s.

That Professor McDowall's clearly written work has met a definite need is proved by the rapidity with which it has passed into a third edition. But not content with such success, he has extended the scope of the correlation of clinical manifestations with physiological facts, and in so doing has had the assistance of Dr. Dunlop. The text is well and simply expressed and thus attractive to the clinical reader, who from the skilful arrangement of the subject matter has a minimum of trouble in finding the answer to his questions. In connection with cardiac efficiency, it is pointed out that the effects of atropine have not been sufficiently investigated as a means of estimating the cardiac reserve, for there is evidence that vagus tone is closely associated with the power of the heart to adapt itself to the increased venous pressure resulting from exercise. The discussion on the importance of mental stress in the causation of persistent hypertension contains references to distinguished men who have thus been brought low, among them Lenin and Luigi, the London restaurateur. The up-to-date character of the third edition is obvious, and to take one example is shown by the inclusion of large doses of sodium chloride in the treatment of Addison's disease.

Handbook of Therapeutics. By David Campbell, *M.C.*, M.A., B.Sc., M.D. Second Edition. Edinburgh: E. and S. Livingstone, 1934. Pp. xx and 444. Figs. 72. Price 12s. 6d.

This admirable handbook, which was first published in 1930, has been thoroughly revised and, in places, rewritten. New features include an article on the cœliac affection, nirvanol in chorea, atebrin in malaria, carbon dioxide as a respiratory stimulant, and the value of ketogenetic diets in septic infections of the urinary passages and in epilepsy. A fuller discussion on the barbitone derivatives, however, would have been welcome, and no mention is made of the extended use of the gold salts in the treatment of rheumatoid arthritis, nor of the non-specific protein substances, such as omnadin, which act without producing an initial general malaise or fever. Nevertheless, this book remains a valuable outline of modern therapeutics, well suited to the needs of the junior practitioner.

General Hæmatology, with Special Reference to the Child in Health and Disease. By W. M. Feldman, M.D., M.R.C.P. London: John Bale, Sons and Danielsson, Ltd. Pp. ii and 96. Figs. 7. Price 2s. 6d.

This pocket monograph well maintains the standard set by this series, edited by Mr. Arnold Sorsby and Mr. Maurice Sorsby, for it gives a very comprehensive account of the blood. Thus it clearly and succinctly deals with the properties, the normal and the abnormal composition, the therapeutic uses and the biological and sociological aspects, of the blood. A chapter is devoted to a general consideration of the diseases of the blood in which a new classification is given with two main headings, abnormal conditions of (*a*) the formed elements, and (*b*) the plasma, the former being divided into quantitative and qualitative categories. The chapter on the blood in treatment describes transfusion of the blood and the uses of blood serum, and is followed by a summary of the bacteriology and parasitology of the blood. The concluding chapter, on the biological and serological aspects, gives an account of the Mendelian transmission of group factors, with interesting examples of the practical applications of this knowledge, such as disputed parentage, identification of a baby, the diagnosis of identical twins, and the case of an impostor claiming to be the " long-lost child."

International Medical Group for the Investigation of Contraception. Fifth Issue. Edited by C. P. BLACKER, M.C., M.D. London: National Birth Control Association, 1934. Pp. 95. Figs. 30. Price 2s.

THE fifth annual report contains articles giving the most recent information from the United States of North America, Denmark, Germany, Russia, and Great Britain. In his Foreword, Dr. Blacker, the chairman of the International Group for the Investigation of Contraception, points out that during the last two years discussions on birth control have been focused upon practical rather than on moral issues. He also contributes the report from this country, which occupies more than half the text and deals with statistics, research into chemical spermicides, and other subjects. The report about Germany was written in Switzerland, as the secretary of the society, in some ways analogous to the National Birth Control Association, has had to leave Germany. That society was suppressed by the Nazi Government and a special " Increase of Population " department created to advocate unlimited propagation, because a falling birth rate would endanger the existence of the German Nation and also on the ground that " the shortage of children is partly responsible for unemployment."

Wine and Food. A Gastronomical Quarterly. Edited by ANDRÉ L. SIMON. Spring Number, 1934, No. 1. London: Simpkin Marshall. Price 2s. 6d.

THE medical profession should welcome the appearance of the first number of the quarterly journal of the Wine and Food Society, one of the objects of which is to improve the standard of cooking in this country. The opening article is entitled " Our bedrugged lives," by Professor Henry E. Armstrong, F.R.S., and succeeding articles are on such subjects as " Golden Sauternes," " English Cheese," and " The 1933 Vintage," while a vivid and succulent account is given of the first five meetings of the society, of which the secretary is Mr. A. J. A. Symons, 6, Little Russell Street, London, W.C.1.

NOTES AND PREPARATIONS

BRITISH HEALTH RESORTS ASSOCIATION AT HARROGATE

A conference of the British Health Resorts Association was held at Harrogate on May 11th, 12th and 13th simultaneously with the Annual General Meeting of the Physical Medicine Section of the Royal Society of Medicine. The use of spa and hydro-therapeutic treatment in diseases of the liver and the skin was the topic of discussion at a joint conference. The discussion on " The use of spas in diseases of the liver " was opened by Professor W. Langdon Brown, Regius Professor of Physic at Cambridge, who reviewed recent additions to the knowledge of the functions and diseases of the liver. He was followed by Dr. J. W. McNee, Dr. Wilfrid Edgecombe and Dr. Curtis Bain. Mr. C. D'Oyly Grange, President of the Harrogate Medical Society and Dr. Curtis Bain made a plea for more specialization among the British spas, which were inclined to suffer the reproach that although their waters were widely different in composition and effect they all undertook to cure the same diseases. Dr. Curtis Bain said that the waters of Harrogate were a powerful cholagogue and a timely visit to Harrogate might avert a future operation for gallstones. Professor D. P. D. Wilkie spoke of the value of preliminary spa treatment in operations on the biliary passages, and Dr. Manson Bahr's remarks on the new era in tropical medicine were received with much interest. At the afternoon session, Harrogate waters in connection with skin diseases of various types were discussed, and it was agreed that their use had been amply proven. Papers were read by Dr. S. E. Dore, Dr. H. Haldin-Davis, Dr. F. A. Bearn and Dr. Bertram Watson.

BRITISH INDUSTRIES HOUSE : MEDICAL SECTION

The institution of a comprehensive medical buying centre in the heart of London was briefly referred to in the March issue of *The Practitioner* (page 416). This is situated in British Industries House, near Marble Arch, and has a medical advisory council of which Dr. Alfred Cox is the chairman. Much progress has now been made, and the centre will be officially opened on July 18, the day prior to the opening of the Annual Meeting of the British Medical Association at Bournemouth. There can be no doubt as to the potential importance of this new venture, and it is receiving influential support from the most prominent medical organizations. It should prove invaluable not only to hospital authorities responsible for spending thousands of pounds on equipment and stores, but also to the general practitioner, who wishes to purchase up-to-date instruments, bandages and splints for use in his own practice, and who will find at British Industries House the products of the principal British firms conveniently and attractively arranged under one roof.

GLUCOTEST SOLUTION

Glucotest Solution B.D.H. is made by the British Drug Houses, Ltd. (Graham Street, London, N.1), and provides a simple, rapid, and accurate method for determining the amount of sugar in urine.

The result may be expressed either as a percentage or in grains per fluid ounce. The glucotest method is not only of great value to practitioners, but is so simple that patients may readily be instructed in its use. The method possesses definite advantages over other alkaline copper test reagents which are commonly used for the determination of sugar in urine. Of the older reagents the most popular is probably Benedict's (quantitative) solution, which shows a colour change from blue to white during the titration. Glucotest solution shows a similar change in colour, but the colour of the reagent is a much deeper blue and the change from an intensely blue liquid to a white suspension is very much more distinct, making the end-point considerably sharper. A further advantage of the glucotest method is the introduction of the glucotest powder, which completely eliminates the " bumping " or explosive ebullition which is often troublesome and annoying with other methods. Moreover, the powder makes the colour change more definite at the end-point.

SAGRADOL

Sagradol is a new laxative, a combination of a liquid paraffin emulsion with cascara sagrada and aromatics, made by the Angier Chemical Co., Ltd. (86, Clerkenwell Road, London, E.C.1), the manufacturers of the well-known Angier's emulsion. As the liquid paraffin softens the fæces and increases bulk and the cascara sagrada is a tonic laxative which stimulates peristalsis without forming a cathartic habit, this combination is one well calculated to be of value in the treatment of constipation. The preparation has a pleasant taste, and can be prescribed with confidence to young and old alike.

SYRUP MINADEX

Syrup Minadex is manufactured by the Glaxo Laboratories (56 Osnaburgh Street, London, N.W.1), and may be described as a threefold tonic: first, it contains iron, which is activated with traces of copper and manganese to enhance its blood-enriching power; secondly, it is combined with glycero-phosphates of calcium, potassium and sodium; and, thirdly, it has a high content of vitamins A and D, which serves to overcome epithelial infections and other deficiency disorders. Originally planned for infants and children, syrup minadex contains none of the alkaloids that create an illusory sense of well-being but have no real therapeutic action. Minadex appears to be a desirable tonic for patients of all ages; and for children its very pleasant flavour is a special advantage.

ELI LILLY AND COMPANY

The well-known American manufacturers of pharmaceutical and biological products, Messrs. Eli Lilly and Company of Indianapolis, U.S.A., has established itself in London with the British private company, Messrs. Eli Lilly and Company, Ltd., at 2, 3 and 4 Dean Street, W.1. The house of Eli Lilly has a very high reputation in America for its ethical standards and has, indeed, contributed not a little to medical progress.

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